The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL.
EDITED BY THE SECRETARY.

VOL. XIX.—JANUARY TO JUNE, 1902.

LONDON:
THE ROYAL GEOGRAPHICAL SOCIETY, 1, SAVILE ROW;
EDWARD STANFORD, 12, 13 AND 14, LONG ACRE, W.C.
1902.

JUN 23 1948

PRINTED BY
WILLIAM CLOWES AND SONS, LIMITED,
LONDON AND BECCLES.

APR 23 1903

The

Geographical Journal.

No. 1. JANUARY, 1902. Vol. XIX.

THE UGANDA PROTECTORATE, RUWENZORI, AND THE SEMLIKI FOREST.*

By Sir HARRY JOHNSTON, G.C.M.G., K.C.B.

In compiling this paper for the Royal Geographical Society, I am anxious, as far as possible, to confine myself to original matter, to give nothing but my own views and experiences, and not to forget that a good deal of the ground I have actually crossed has been traversed by preceding travellers, many of whose accounts may still stand as authoritative, and in some measure final. In order to be systematic, I propose to take the Uganda Protectorate province by province, and give what original information I can about each province in its turn.

As one of the results done by the work of my Special Commission, I should mention that the Uganda Protectorate was definitely divided into provinces and districts for administrative purposes. A map illustrating these divisions was published by His Majesty's Government in illustration of my last Report on the Uganda Protectorate in July, 1901. The provinces are six in number: Eastern, Rudolf, Central, Nile, Kingdom of Uganda, and Western. Each province is divided into a number of districts, ordinarily three or four, but in the case of the Kingdom of Uganda, into twenty administrative divisions.

The Eastern Province stretches from the western boundary of the East Africa Protectorate—which is more or less the line of the Kikuyu-Laikipia Escarpment—on the east to the shores of the Victoria Nyanza, and the vicinity of Mount Elgon on the west. On the north it extends to that little-known salt lake or swamp Sugota and the vicinity of Lake Rudolf. The scenery and the climate of this province are extremely varied. On the extreme south, towards the German frontier,

* Read at the Royal Geographical Society, November 11, 1901. Map, p. 120.

102230
JUL 16 1903

down the depression of the Rift valley, it tends decidedly towards sterility, while at the same time the general level (except on the Mau highlands) decreases from the average 6000 feet of the central part of the province to about 3500. Likewise on the north the tendency is also to a decrease of level, and with this decreasing altitude to a diminution in the rainfall and consequent deficiency in vegetation. About Lake Naivasha that remarkable geographical feature known as the Rift valley—a winding depression of an average 40 miles in width, which is bordered on either side by more or less regular mountain cliffs, and can be traced imperfectly through East Africa from the vicinity of Lake Rukwa on the south to the Gulf of Aden on the north—is arched to its greatest altitude of 6300 feet. North-west and south-west the floor of the Rift valley diminishes in altitude. South of Lake Naivasha, as already stated, there is a marked decrease in the annual rainfall, and a tendency in the Rift valley towards a desert appearance. This is again the case north of Lake Baringo, and the country between Baringo and the north end of Rudolf offers, in many parts, a striking resemblance to the Sahara, not only in the deficiency of vegetation, but in the character of such plants as do survive, and to some extent also in the fauna, especially amongst birds and mammals.

The traveller from Mombasa, before reaching the frontier of Uganda, has passed through the country of Kikuyu, which is well forested and richly clothed with vegetation. As he descends into the Rift valley the Kikuyu vegetation decreases in luxuriance, and a very prominent feature is a particularly ugly form of dracœna (a kind of tree-aloe) with stiff sword-leaves of a sickly yellow-green. In the vicinity of Lake Naivasha there is short sweet grass, which is probably kept low by the browsing of innumerable antelopes and the herds of Masai cattle. Near Naivasha station the Kikuyu escarpment, descending in a series of terraces, terminates abruptly in a line of precipitous cliffs, on the edges of which huge boulders and monoliths are poised. The shores of Naivasha are in many places thickly belted with papyrus, which is growing at an altitude (over 6300 feet) and in a mean temperature not usually associated with this rush. On the western and northern sides of Naivasha there are belts of forest usually consisting of acacias. There is a great deal of water-weed in the lake, which at certain times of the year makes portions of its surface absolutely orange-brown. There are two large islands. The smaller of these two, which is near the eastern shore, is, by means of an intervening island, sufficiently closely connected with the shore to be within reach by swimming of various types of large game, while on the other hand the water to be traversed has served to cut off the island from visits by man, local and native man belonging to the Masai and kindred tribes being entirely unpossessed of canoes, and not much given to swimming. The result is that, until within recent years a

boat was placed by the British Administration on Naivasha, these islands had probably never been visited by man, and the antelopes and other game living on them were found to be extraordinarily tame. The boat in question was stove in by a hippopotamus, and has therefore become useless. One of my last directions given before I left Uganda was to the effect that this island near the eastern shore should be constituted a game reserve, a park in which the antelopes now inhabiting it might continue to dwell in safety. There are no crocodiles in Lake Naivasha, though there are hippopotamuses. It was formerly stated that there were no fish, but my assistant, Mr. Doggett, discovered small fishes there belonging to the types I have found in this chain of lakes in

ON THE NANDI PLATEAU.

the Rift valley. The water-birds are not quite so abundant as formerly, owing to the extent to which they have been shot at by Europeans; but during one of my visits to the lake I enjoyed a beautiful spectacle of rosy flamingoes in regiments of thousands lining the northern shores.

The amount of game to be seen about Naivasha is probably more abundant than formerly, owing to the measure of protection it has received, but I should say there was less variety in the species, certain animals having died out owing to the former persecution at the hands of sportsmen (natives as well as Europeans), and owing to the ravages of cattle-plagues. The most prominent animals seen in this part of the Rift valley at the present time are Grant's and Thomson's gazelles, Coke's and Jackson's hartebeests, water-buck, oribi, zebras, lions, leopards,

and hyænas. The Aard wolf of South Africa is also found in the vicinity of Lake Naivasha.

Man as a native is not very frequently met with in this part of the Rift valley, a good deal of the country being quite unpopulated. The Mau forests, which begin on the Mau escarpment to the west of Lake Naivasha, are, however, thinly inhabited, and their inhabitants consist for the most part of wandering Masai and Andorobo. Westwards of the densest Mau forests begin the settlements of the Sotik and Lumbwa. These people belong to the same race and speak the same language as the Nandi, and this Nandi group of people and languages extends as far north in their scattered distribution as the northernmost slopes of Mount Elgon, if indeed they are not found inhabiting other mountain ranges further north-west still in the direction of the Karamojo country. The westernmost portion of the Naivasha district at the present day is the coastland of Ugaya, along the Victoria Nyanza, and here the inhabitants seem for the most part to belong to the Nilotic Negro section in language, if not wholly in race;* but between these people of what used formerly to be called Southern Kavirondo and the mountain races of the Lumbwa and Sotik who belong to the Nandi group, there is a most interesting wedge of Bantu-speaking people, known by their Masai name of Kósova,† but calling themselves Bagizii. The credit of this interesting discovery is due, in the first place, to Mr. C. W. Hobley, the sub-commissioner for the Eastern Province who has done so much during the past six years to increase our knowledge of the geography and human races of East Africa. Mr. Hobley directed my attention to the fact that the Kósova people spoke a Bantu language, and, by inducing representatives of this tribe to visit me, enabled me to take down extensive vocabularies of their dialect, which turns out to be a most interesting and archaic form of Bantu, allied to the languages of Northern Kavirondo and of the western slopes of Mount Elgon.

In the Rift valley round about Naivasha, the dominant people are the Masai, though occasionally representatives of the Kikuyu tribe come down from the eastern heights for the purposes of trade, while that tribe of more or less nomad hunters, the Andorobo, range at will up and down the valley in pursuit of game. In language the A-kikuyu are of course purely Bantu, and their language, though it offers more archaic features, is most allied on the whole to the Kamba group of East Africa. I need say nothing about the A-kikuyu here, as the peculiar features of

* Since this was written, Mr. Hobley has made the interesting discovery that the inhabitants of the two large islands off the mouth of Kavirondo bay, and the inhabitants of the coast of the lake southwards to the German frontier, belong to tribes speaking Bantu languages. I have, however, myself met Nilotic-speaking natives from the Ugaya coast.

† Pronounce "Káwsŏvă."

that race have been admirably illustrated in a paper by Mr. Richard Crawshay, which will shortly be published in the *Journal*. The Masai of the Naivasha district belong to the essentially cattle-keeping, semi-nomad division of that race, and were until quite recently one of the clans depending on the great chief who resided more or less in the neighbourhood of Nairobi. Quite recently, however, for political reasons, it has been thought advisable to make the Masai dwelling within the Eastern Province of the Uganda Protectorate independent of any political connection with those of the adjoining East Africa Protectorate or of German East Africa. The Masai of Naivasha differ very little in characteristics from those dwelling between Mounts Kilimanjaro and Kenia, who have been so often described by travellers from the time of Joseph Thomson onwards. The chief difference that I notice myself is in the shape of the spear, which is far longer and less broad than that used in the neighbourhood of Kilimanjaro. I agree in all that has been said by the best authorities on the subject of the Masai as regards their splendid physical appearance and their many amiable traits in character. They are emphatically a lordly race. It is doubtful whether they have ever been inherently unfriendly to Europeans, and most of the disasters which occurred in the early days of the opening up of East Africa were in the first place the fault of unscrupulous European traders, who certainly wronged the Masai before these people were provoked to reprisals. No sooner has British authority been established with emphasis, and I hope with justice, in these regions, than the Masai have —at any rate in the Uganda Protectorate—taken our side in any troubles we may have had with other native tribes. At the present moment the whole of the Masai of the Rift valley between German East Africa on the south and Lake Baringo on the north, have shown themselves ready, at a word from us, to enrol themselves as a contingent of irregulars, for the effectual chastisement either of the Nandi or of the Suk—two tribes whose aggressions on Europeans were remarkable in the history of East Africa, in that they were so little the result of anterior provocation and so much the direct outcome of a desire for robbery. Unfortunately, at the present moment, the Masai race is on the road towards extinction. It received a staggering blow from the severe cattle-plagues which have raged throughout East Africa at intervals from the beginning of the "eighties" to the present day. It is, of course, well known to most Fellows of the Royal Geographical Society that the Masai as a race are divided into two very different sections, the cattle-keeping, semi-nomad Masai proper, and the agricultural Masai, who are variously known as the Gwas 'Ngishu, Enjamusi (Njemps), who call themselves "Nyarusi," and Kwavi.* Whether the Masai were originally an agricultural people, a section of whom, by

* I cannot say I have ever heard a Masai-speaking person use the term "kwavi." It is a word of quite unknown origin introduced by Krapf.

means of its rapid conquests of East Africa, turned its thoughts entirely towards cattle-keeping and bothered no longer to till the ungrateful soil, or whether they started as a pastoral people of which a section only turned to agriculture after great misfortune, I cannot at the present time determine. At any rate, some sixty or seventy years ago, or even further back, one section of the Masai in the Baringo and Elgon districts seems to have taken definitely to agriculture and a life of settled towns, while the other and larger division depended solely for its subsistence on the milk and meat of its flocks of cattle, sheep, and goats, and only obtained such vegetable food (as was eaten by its old men and women) by trading intercourse with the neighbouring agricultural races of Bantu speech. The Masai cattle-keeping section turned on the Kwavi or agricultural section many years ago with fierce attacks which very nearly led to the extermination of the weaker agricultural communities. These, however, survived the struggle in scattered settlements, and are now on the road to increase and prosperity. On the other hand, the far larger section of the tribe which has depended hitherto solely on its flocks and herds for subsistence is in many districts badly off for food. The advent of the Uganda railway has had a strange influence also on the fate of this race. The Masai women, never at any time remarkable for strict virtue, were extraordinarily attracted by the Panjabi coolies from India, and flocked in numbers to the railway, where they became the mistresses of these stalwart, bearded men from Northern India. Not only did the men of their tribe appear to resent this defection of their women but slightly, but they themselves seem to have acquired an actual dislike for the getting of children, due in part, no doubt, to the uncertainty as to food, and in part, also, to their love of a restless, wandering life. They too have been much attracted by the railway and the work on the line, strangely as this last may seem to differ from their normal habits. Where they settle down at all, it is rather by marriage with Kikuyu women or women from the East Coast. From one cause and another, therefore, the Masai race is tending somewhat to disappearance, either by dying out or by fusion with other tribes. The last year or so, however, there has been a marked increase in prosperity amongst the Masai of Naivasha. The Uganda Protectorate has been strangely and happily free from cattle plagues of late years. There have been absolute law and order in affairs in the Naivasha district, at any rate for the last three years. The Masai have had a splendid market in the Uganda railway for the disposal of their extra live stock; their fighting men have received pay and encouragement from the British Administration, which have utilized their services in putting down local disturbances. I may also say we have been fortunate in the military and civil officers employed in these countries, and I am, therefore, in hopes that the Masai of the Naivasha region may increase and multiply and preserve their purity of race.

The Andorobo, of whom such frequent mention has been made from the time of Joseph Thomson onwards, appear to be one of two semi-nomad tribes who are to a great extent associated with the Masai. The other tribe in question is called the Engugunya, and of these I know nothing, as I have seen no representatives of them; but with regard to the Andorobo, I am now able to speak with some authority as to their characteristics and origin. Physically and linguistically the Andorobo are nothing but a branch of the Nandi stock. Their language only differs from the language spoken in Nandi or Kamasia to the same extent that Lowland Scotch differs from London English. Yet physically there is no fixed type amongst the Andorobo any more than there is

THE CRATER RIM OF ELGON FROM THE WEST.

amongst the Nandi. Perhaps, however, the Andorobo are composed of even more varied human types than the Nandi tribes. I can only define them somewhat clumsily as being a mixture of the Nandi with some pre-existing race of a very low type, possibly closely allied to the forest Pygmies of West Central Africa. But the Nandi type, again, is very mixed, consisting fundamentally of a stock like the Masai, which has mingled with some low Pygmy type, the Masai features, however, predominating. Then the Masai, again, are an ancient mingling of Nile Negro with Hamite, that is to say, some Negroid or non-Negro race like the modern Gala and Somali. Amongst the Andorobo you will see, if not in the same family, at any rate in the same cluster of people, hideous little black prognathous dwarfs side by side with handsome youths of almost European features. The Andorobo construct for themselves

small huts in the vicinity of their hunting-places. This little village of huts is sometimes surrounded by a thorn hedge. The huts in shape and size are strangely reminiscent of the Pygmies in the Congo forest. The Andorobo are semi-nomadic—that is to say, they establish temporary villages in places where game is abundant, and they may resort to these villages periodically according to the fluctuations of the game-supply. Formerly they were much kept in order by the Masai, and the Masai, for reasons of indifference, left wild animals alone and did not kill them for food. But since the Masai have been prevented from domineering over other peoples, the Andorobo have shown their ingratitude for this Pax Britannica by a reckless slaughter of all forms of game, from monkeys to elephants.

The water of Lake Naivasha is quite sweet, though it is sometimes so full of vegetable matter as to require careful filtering. The water of Lakes Nakuro, Elmentaita, and Hannington is nauseous and utterly undrinkable. The water of Lake Baringo is more or less undrinkable close to the shore, especially when the level of the lake is low. The natives therefore push out in their canoes some hundreds of yards into the open lake, and there obtain water which is fairly palatable. At the time I saw Lake Baringo there had been a rainy season of exceptional duration, and the waters of the lake, owing to the overflow of its feeding rivers, extended a considerable distance beyond where the southern shore is marked on the map. On the other hand, the swamps north of Lake Hannington were also full, and it seemed to me that I waded through water almost the whole way between the southern portion of Baringo and the north-east shore of Lake Hannington, into which, by the way, a river falls not marked on the map. So far as my eye alone can judge, I should think that at one time, and even at the present day in exceptional rainy seasons, the waters of the two lakes were united. Lake Hannington is one of the most beautiful sights which can be offered by the Uganda Protectorate. It lies at the base of tremendously high mountains, which tower above it so precipitously that their reflection seems to occupy the whole surface of the lake when seen from its western shore. Therefore the waters appear a very deep blue-green, and their surface is so still, and the mirror-like reflection so complete, that when coming upon the lake suddenly it is difficult to realize at first that you are looking down on a lake, and not on some awful chasm in the Earth's surface over which hundreds of thousands of flamingoes are floating; for the only thing real about the lake when seen under these conditions are the flamingoes, the still waters being such an absolute mirror of the surrounding mountains. On Lake Hannington it is no exaggeration to say that there must be hundreds of thousands, if not close upon a million, flamingoes. They belong to the rosy species, which is slightly smaller than the Mediterranean flamingo, but exquisitely beautiful in plumage. These flamingoes nest

on a flat plain of mud about a mile broad to the north end of Lake Hannington, where their nests, in the form of little mounds of mud with feathers plastered on the top, appear like innumerable molehills. The birds, having hitherto been absolutely unmolested by man, are quite tame. On the north coast of the lake they extend for at least a mile in density from the muddy plain mentioned above right out into the waters of the lake. Seen from above, they look like a belt which on its outer side is grey-white, then becomes white in the middle, and possesses an inner ring of the most exquisite rose tint. The reason for this is that all the birds on the outer edge of the semicircle are the young in their immature plumage, those in the middle of the belt are full-grown birds that have not acquired the full beauty of the adult, while along the inner edge are old birds in the full beauty of a plumage which ranges from pale blush-pink to scarlet-crimson. Lake Hannington is known to the Masai as Mbatibat, and to the Kamasia tribe as Makaria. I might mention that the real Masai name for Naivasha is Naiposha. Baringo should be called Mbaringo; Nakuro and Elmentaita are approximately correct. Naiposha is a common Masai word for "lake," and is often applied to pieces of water like Baringo. Lake Sugota is a stretch of fairly open water, though no doubt it shrinks in dry seasons considerably, and a good deal of its space is given up to weeds. I have not seen it myself, but it has been sighted by military officers journeying with me from the heights of the Ribo hills.

The Kamasia people, whom I have already mentioned, are simply a northern branch of the Nandi, as are also the Elgeyo and Mutei. The Kamasia really call themselves Eltuken, Kamasia being a name given to them by the Masai. The Elgeyo escarpment is certainly one of the "sights" of the Uganda Protectorate—at any rate, as seen from its western aspect. You seem to look down a sheer 5000 feet in a straight drop on to a trench-like valley, the floor of which is covered by a small lake,* several lakelets, and a connecting river. North of this escarpment (the plateau between its western edge and the slopes of Mount Elgon being almost entirely uninhabited) the Suk people begin, and extend from the upper waters of the Turkwel river south-eastwards to the north end of Baringo. The Suk are intimately connected with the Turkana of western Rudolf, and also with the Karamojo people to the west of the river Turkwel. The differences between their languages are hardly greater than between Spanish and Italian, while between the Suk and Turkana there seems to be no difference in physique, appearance, manners, or customs. So far as community of language goes, there is a curious branch of this Suk-Turkana group to be found to the south-west of Mount Elgon in the Elgumi people. As regards linguistic affinities, the Suk-Turkana group of languages is almost exactly midway between Masai on the one

* Discovered by Mr. F. W. Isaac.

hand, and Nandi on the other, while all these groups offer distant but distinct affinities to the languages of the White Nile—Dinka, Shuluk, and Acholi.* The Bari and Latuka of the upper Nile are more closely related to the Masai. The Suk, like the Turkana, are a race of very tall stature, though it is very often easy to exaggerate their height in measuring merely by the eye and not by the tape. Still, in my anthropometric records I have recorded the measurements of several Suk of 6 feet 3 inches, who did not appear singular for their height amongst a number of tall comrades. The Suk, like many allied races to the north and north-west, wear their hair in extraordinary bags down the back. As this mode of wearing hair has been fully described by me in recently published numbers of the *Graphic*, I will not repeat the description here.

From the north-eastern buttresses of Mount Elgon, and the headwaters of the Weiwei river on the north, to the frontier of German East Africa on the south—a distance of about 240 miles—extends at altitudes ranging between 5000 and 10,000 feet (but ordinarily standing at an average height of 7000 feet), one of the most beautiful and healthful districts to be found anywhere in the Dark Continent. This belt of country, which has an average breadth of 45 miles, is a continuous plateau called in the south Mau, in the centre Nandi, and in the north Elgeyo and Gwas' Ngishu. In order not to be too diffuse in nomenclature, I shall henceforth style this lofty region the Nandi plateau, as it is mainly inhabited—so far as it has any human inhabitants at present—by races of the Nandi stock.

The scenery on the Nandi plateau reminds the homesick official and traveller over and over again of England, of Wales, of Scotland. Here are the swelling green downs crested with beautiful woodland, reminding one of Sussex or Surrey. Here is a roaring Scotch burn in full spate, the colour of foaming beer, tearing down over grey boulders through a forest of gaunt junipers, which at a little distance might well be pines or firs growing on Scotch mountains. Here you may see the Brecknock Beacons, scenery more mountainous than the Sussex downs, yet with the glorious woods of Surrey, and the aspect over and over again of Wales. The natural meadows are full of blue forget-me-nots or of pink or white clover. In the ferny hollows on the edges of the woodland are innumerable violets (scentless, alas!), buttercups, daisies, and many other English-looking flowers and ferns growing amid the short grass. There is also a very pretty little dwarf iris, which, although not English, is still very European. In marshy spots on the higher uplands grows the golden rod of South Africa—the "red hot poker" of old-fashioned gardens. Here there may be seen in large clumps the extraordinary lobelias, the flower-columns of which grow to a height of 15 feet and more. This beautiful land has not in it a single ugly or unfriendly

* Wrongly spelt—following Sudanese-Arabic mispronunciation—"Shuli." The name really is Acholi, or Atsioli.

spot. Everywhere the landscape is gracious and pleasing in a quiet, homely way, offering few violent forms or startling effects. It is thus singularly home-like, and as it is almost entirely without native inhabitants, it seems to be awaiting the advent of another race which should make it a wonderland of wealth and comfort, a little England, half a Scotland, or a large Wales lying exactly under the equator at an average altitude of 4000 feet * above the Victoria Nyanza, of whose silvery gulfs and ghostly mountain coast-line strange glimpses at a

THOMSON FALLS, SASURU RIVER, SOUTH ELGON.

distance of 90 miles may be caught occasionally from some breezy height or through the interstices of woods which themselves might be in Surrey. These views of a vast but distant seascape, which, owing to the height of the horizon, seem to appear in the sky, give that occasional touch of weirdness to the Nandi landscapes which would be the case in England or Scotland, if amid familiar landscapes we suddenly saw

* In its lowest parts the plateau is 6000 feet, and in its highest over 10,000 feet, above sea-level.

limned in grey or silver in the lower sky the features of a foreign land. In the direction of the Victoria Nyanza, the plateau sometimes crumbles away into broadening river-valleys, through which one descends rapidly from the temperate zone of conifers and buttercups to palms and wild bananas, or ends abruptly in an awful wall 2000 feet and more in sudden drop, or descends in a series of terraces which are covered with a tropical forest, recalling most closely that of the Congo, and possessing much the same fauna and flora. A notable feature of these forests in all parts of the Uganda Protectorate are the butterflies, the colours of which are brilliant even for the tropics. One butterfly, about the size of the English tortoiseshell, is simply pure scarlet all over the upper surface of the wings. Others are pure ultramarine blue, others purple, while there are the usual gorgeous swallowtails of all tints, and huge opalescent *Papilionidæ*. But perhaps the ones that are coloured pure vermilion, and are sufficiently numerous to be a remarkable feature along the path, made the greatest impression on my sense of colour.

When one reaches the north-eastern shores of the Victoria Nyanza, the scenery is disappointing. Kavirondo bay or gulf, that lengthy northern prolongation of the Victoria Nyanza, is a huge backwater of the lake where the water stagnates and entirely loses the blue limpidity ordinarily characteristic of the Victoria Nyanza. It has a dirty green, or even a dirty brown, look. Seen from a distance when ruffled by the wind, it so closely resembles a red ploughed field that it is difficult to believe you are looking on a sheet of water. The ground is either a rank marsh (where the only beautiful feature is the numerous sacred ibises of inky black and snowy white) or harsh rock. There are very few trees, and the principal object in all these landscapes is the candelabra euphorbia, a form of vegetation in which I have never been able to see any beauty.

The people who inhabit this coast-belt are styled Kavirondo. It is difficult to ascertain whence this name arose, but in its origin it appears to have been applied to the Bantu-speaking folk in the Elgon district. South of the Yala river, along the coasts of Kavirondo gulf, right round to the German border, the population belongs mainly to the Nyifwa stock. Physically they offer a somewhat mixed type, which differs little if at all from the average Kavirondo Bantu-speaking population to the north of the Yala river. They speak a language, however, which differs no more than dialectically from the Acholi tongue. The Acholi —incorrectly termed Shuli—is a language which is spoken between the White and Victoria Niles and the northern coasts of the Albert Nyanza on the west and the vicinity of Mount Elgon on the east. The range of this language is limited on the south by the Bantu-speaking people of Uganda, Busoga, and Kavirondo. On the north the extension of this tongue is bounded by the Bari-Latuka-Masai family of languages, which stretches right across to Lake Rudolf; but north of the Bari

tongues appear the Dinka and Shuluk, who speak languages *closely* related to Acholi. At one time or other the Acholi people must have sent important raids to the north-east coast of the Victoria Nyanza, leaving their language behind them to this day. At the present time the Acholi language and the Nyifwa people of this Kavirondo coast are only cut off from their Acholi relations by a narrow band of Busoga, Kavirondo-Bantu people, and also by that strange enclave of Bari-Masai languages—the Elgumi (who come in as a wedge between the Busoga on the west and the Bantu-speaking peoples of west Elgon on the east). Both the Nyifwa and Bantu-speaking Kavirondo on the north-eastern coast-lands of the Victoria Nyanza have been remarkable since the days of Joseph Thomson for their Adam-and-Eve like nudity. They are a most agreeable, friendly people as a rule, and said to be very strict in their morality, but they are absolutely naked and unashamed. A great deal of nudity is seen amongst the men between Kilimanjaro on the east and the Nandi plateau on the west, but in all these countries the women are more or less scrupulously clothed. In Kavirondo the women are as naked as the men.

I will now attempt to give some description of Mount Elgon and its surroundings. I travelled completely round this mountain. Reaching its vicinity first from the settlement of Mumia's on the Nzoia river,* I passed through Bantu Kavirondo, then a narrow belt of Elgumi (a fine, tall people, whose language I have already stated is a dialect closely related to Suk and Masai), and then reached a country on the northern slopes of the mountain inhabited by a branch of the Nandi race whom the Masai call Elgoiny.† It was from this Masai name that Joseph Thomson derived the somewhat incorrect version of Elgon, which is the name under which this great extinct volcano will henceforth be known. This tribe of Nandi race has no collective name for itself. It is closely related in race and language to the Sabei people on the northern slopes of Elgon, and the two communicate one with the other by roads right across the crater. The villages of these people, and of some of the adjoining Kavirondo, are remarkable for the clay walls with which they are surrounded. Outside the clay wall is a deep moat crossed by bridges of earth or planks which correspond with gateways in the clay wall. These gateways are often rudely arched by means of boughs. The style of these clay walls somehow or other strikes the traveller as being due to some teaching from the north, though there is no clue at present to the direction from which this idea came. On the southern, as on the northern, side of Mount Elgon, the awful mountain-cliffs which mark one of the lower terraces of this tremendous crater are

* Often called the Nzeia by the natives.

† It is difficult to express this sound in writing when the *y* comes as a final. It is as though there was a vowel at the end of the word which had been elided.

honeycombed with deep recesses or caverns. The rocks here I find some difficulty in describing geologically. The specimens which I detached for description at home are described as being "augite crystals," "nephelinite," "decomposed rocks," "fossil wood," "augite in volcanic bomb," and "basalt." To a person sadly ignorant as I am of geology, these rocks often appeared as being like sandstone, and in all the stream valleys the pebbles were thickly strewn with black coal-dust and minute pieces of coal which seems to be anthracite. I am quite unable to throw any light on the origin of these curious recesses, which are the well-known caves of Elgon, the caves which were first discovered by Joseph Thomson. They are almost always situated close to the base of a precipitous or overhanging cliff of rock. Man may have enlarged them here and there by hacking at the crumbling and decomposed rock, and this has no doubt been done to some extent. The interior of these caves is blocked up in some cases by houses made of sticks and laths, over which cow-dung and clay have been plastered. The ceiling is of course the sloping roof of a rock. Some of these dwellings are used for the housing of cattle, sheep, and goats, others for human beings. The floor of these caves is, I should say, several feet thick in the hardened excrement of cattle, besides refuse and rubbish thrown down by the humans. The caves so swarm with fleas, and are so noisome from the atrocious stench arising from this ancient manure, that any extensive examination of them was intolerable. I should think, however, that some one with more time and patience at his command than myself on this expedition, and who would endure for a time the attacks of the fleas, might obtain most interesting results by excavating the floors of these caverns. Native tradition never stretches very far back in these countries, but as far as it does stretch, the people declare the caves to have been inhabited from the earliest days of their traditions. Nowadays, owing to the Pax Britannica, they are practically deserted. The natives told me they would only be re-occupied either if war broke out again, or if any unusual drought occurred in the lowlands, obliging them to drive their cattle to these mountain pastures. Several of these caves, curiously enough, are completely concealed from view in front by a curtain of water. The cave coincides with the descent of one of the gloriously beautiful waterfalls for which Elgon should be famous. The path leading to the cave takes you dryshod under a river, and when you are seated at the mouth of the cave you see the splendid glowing landscape through an opal-tinted veil of water. I visited several caverns, but amongst others the one which was the first cave reached and discovered by Joseph Thomson, whose visit the natives still remember vividly. This cave also was masked by a splendid waterfall, a waterfall not represented on the map. It is the descent of the Sasuru river, and I would propose to name the waterfall the Thomson falls, as it has no name in the native

language, and as so many of the waterfalls of Elgon commemorate the explorers who have made this country known. It is hardly necessary to add that Joseph Thomson here, as wherever else he passed in Central Africa, left behind him the most pleasing memories. Fate has ordained that I should often have had to travel in his footsteps, and I have always noted that where he has been the first white pioneer his admirable treatment of the natives has ensured a kindly welcome to those who followed. I might state that one of the minor chiefs of this

PAPYRUS MARSH, UGANDA.

part of the mountain, who guided me to the Thomson falls and showed me the caves, possessed as a relic of Joseph Thomson half a *Nineteenth Century Review*, a copy of that review which had been cut in halves and left behind. This the man believed to be a kind of treaty with the white man, and he always exhibited it with one end clutched firmly in his hand, so that so precious a document might not be taken from him.

The vegetation on the western flanks of Elgon is extremely rich, and quite West African in character; whereas on the other sides of the

mountain it is essentially East African. The scenery on the western side is perhaps grander and more beautiful in its details than on the other aspects of the mountain. Tremendous buttresses and precipitous sides of gleaming granite or quartz advance from the great blue crater wall into the Bukedi plains. An excellent road has recently been made all round the face of the mountain by an enterprising Uganda chief, whom I had placed temporarily in charge of this district. From this road one obtains the most beautiful views of lakes and marshes in the direction of those vast backwaters of the Victoria Nile. The native inhabitants of west Elgon are of the greatest interest. They are of rather a mixed stock, but all are of very low and ape-like appearance. Some stunted individuals recall irresistibly the Pygmies of the Congo forest, whom they closely resemble in features and low stature. Others, again, remind one of those strange, ape-like pariahs seen by Messrs. Grogan and Sharpe, myself, and others on the eastern edge of the Congo forest. The greatest interest they possess, however, lies in fact that they speak a Bantu language which, of all those discovered, possibly comes nearest to the original form of the Bantu mother-tongue. I have no space to dilate on the features of this language in this article; I must reserve my account of it for my book. I might, however, call the attention of the Society to this interesting fact. That great philologist, the great Dr. Bleek, who invented the name Bantu, and who was the first to give any definite account of the features of the Bantu languages, attempted to reconcile curious differences of form between the prefixes and their corresponding particles or pronouns, and also to explain the origin of that preliminary vowel which begins the prefix in so many Bantu languages of archaic type. He drew from the small evidence at his disposal the brilliant deduction that originally the prefixes were in a much more ample form of two syllables. It would be out of place if I gave all the particulars here, but I might say that these Bagesu people of west Elgon exist at this day to confirm Dr. Bleek's hypothesis, for they utter prefixes almost exactly in the form which Dr. Bleek believed must have represented their original condition. This language, in fact, almost more than any other, will enable us to reconstruct the original form of the Bantu prefixes, and to explain changes which have since occurred to differentiate the prefix from its corresponding pronoun.

The Sabei people of north Elgon are, as already stated, another branch, and one of the most northern, of the Nandi stock. They are mostly a handsome people, but occasionally possess wives whom they have captured in warfare from the hostile Bantu to the west of them, and these women are hideous and ape-like. From the Sabei country, which is mostly at an altitude of 7000 feet, one can distinguish clearly the outlines of Lake Salisbury, Lake Gedge, and of the swampy rivers that feed these open stretches of water. One can even see to the north

the Nakwai hills and the heights of Karamojo. Prominent objects on the north-east horizon are the splendid mountain mass of Kamalinga and the still more picturesque peaks of Debasien. So far as outline goes, I think Debasien is the most beautiful mountain I have ever seen in Africa. Its height is given on Colonel Macdonald's map as not exceeding 9700 feet. This is probably correct; but as the mountain rises sheer from a plain whose altitude is not much over 3000 feet, it appears much more lofty, and at a guess one would give it 11,000 feet at its highest point. Parts of this mountain appear to be richly clothed with forest, but as the eye wanders over the vast plains to the north one can easily distinguish decreasing vegetation and a commencement of that sterility which afflicts so much of the northern parts of the Uganda Protectorate. To the east of Debasien rise the Suk and Karamojo mountains in fantastic forms, some of them with crags thousands of feet in height, which appear to be falling over. To the south-east of Debasien the northern buttresses of Elgon stretch out towards the Suk highlands in a series of hills or hillocks of strangely regular, conical shape, as regular in their pyramidal outline and the sharpness of their apices as if they had been made by man. To the north-east of Elgon one touches that average East African dryness and poorness of vegetation which is so characteristic of the lowlands between Abyssinia on the north and Nyasaland on the south. The courses of rivers are dotted here and there with tall shady trees, but outside these there is a paucity of vegetation which, I confess, after the rank luxuriance of west Elgon, was rather welcome.

From the Sabei country I was obliged to travel for sixteen days to the Ravine station without a road, simply guiding my caravan by the map and eye. Occasionally I would lead them to the edge of a morass, or to an unfordable river, or to a ravine of such precipitous sides that it was untraversable. Then a *détour* had to be made. But for the most part the country was an easy-going steppe, relatively merciful in its moderate development of vegetation. From the north-east of Elgon to within sight of the Ravine station, we passed through a land whose only human inhabitants were a few wandering and fugitive Andorobo, a land simply swarming with big game. We saw large herds of elephants firstly; then many rhinoceroses; then literally countless hartebeests, water-buck, reedbuck, Cobus antelopes, bastard hartebeests, and oribi. Herds of zebras would follow the caravan, snorting and kicking up their heels. There were lions, leopards, wart-hogs, jackals, and many ostriches. Last of all, in the middle of the Gwas 'Ngishu plateau, where forests of acacia still lingered, and before the elevation of the ground had led us to the region of the conifer, we came upon giraffe, upon this five-horned giraffe which appears to be a new species of that remarkable animal, and apparently the common form of giraffe between Elgon on the west and Lake Baringo on the east. Seen from

a distance, these giraffe appeared, when adult, to be black and white, black with white bellies and limbs. Here and there monsters stood on the tops of large anthills or small hillocks, sentries posted to warn the feeding herds of the approach of the giraffe's only enemies, man and the lion. Yet so little had man harassed these creatures during recent years, since the plateau was divested of its human inhabitants, the Gwas 'Ngishu Masai, by civil wars, that these sentinels seem to have taken little or no notice of our caravan. Feeling sure that there was something unlike the ordinary giraffe about these beasts, I sanctioned the breaking of one of our game regulations, and myself with the aid of Mr. Doggett secured four specimens—two males and two females—for the British Museum. This animal will have been described by Mr. Oldfield Thomas in the *Proceedings of the Zoological Society*.

It is a great contrast to pass from regions like this to the islands of the Victoria Nyanza, and these again differ markedly in appearance one from the other. Some of these islands consist of little more than enormous smooth monoliths, or great boulders of rock piled one on the other as though they were enormous ruins of a Cyclopean race. Some of these rocks are snowy-white with the guano of cormorants and other water-birds, who make them their perching or nesting places. Again, other islands have sandy shores, and are covered with the most luxuriant forest. Others again rise into green downs above the forest-level. The island of Buvuma is a little world in itself, and resembles very much in shape the island of Celebes. In Buvuma the downs rise into mountains of more than 2000 feet above the level of the lake, heights which will prove valuable and accessible as sanatoria for the white settlers on the shores of the Victoria Nyanza. The island of Buvuma is of great interest. Its inhabitants belong to the same stock as the Busoga, and do not differ markedly in appearance or language from that people, or from the kindred Baganda. But for a hundred years or more there has been a deep-seated feud between them and the Baganda. Many a king of Uganda has endeavoured to conquer Buvuma and has failed. At the present time a Muganda chief is stationed there as resident, but the affairs of the island are supervised by that excellent servant of the Uganda Protectorate, Mr. Grant, who is the Sub-Commissioner for the Central Province. In Buvuma the people have resolutely refused Christianity, and they adhere to the old fetishistic religion. They worship at least ten *Balubari*, or spirits. The worship of these spirits is chiefly carried on by offerings of food and drink that are placed in little huts outside the village. These huts of grass are surmounted by a long peak or steeple made of sheaves of grass. Sometimes, however, the fetish-place is a hollowed stone, and over this is suspended a large grass "extinguisher" hung from the bough of a tree. In Buvuma it seemed to me as though many of the plants and birds differed from those of the mainland, but my ideas on this point have

A GENERAL VIEW OF THE RUWENZORI RANGE TAKEN FROM AN IMAGINARY HEIGHT OF 10,000 FEET E.N.E. (TO GIVE A PANORAMIC IDEA OF THE SNOW-PEAKS, ABOUT 30 MILES FROM NORTH TO SOUTH).

not been much confirmed by the specimens collected. Still, I should think that in many respects this island deserves very careful examination.

Busoga, which together with Elgon constitutes the coastland of the Central Province on the Victoria Nyanza, is a fertile, well-forested country on the east side of the Victoria Nile, closely resembling Uganda in its appearance, productions, and people. It is the first definite taste of West Africa which the traveller coming from the Indian ocean gets as he advances towards Uganda. The Sio river, one of the few streams which actually enter the northern half of the Victoria Nyanza, is a very well-marked boundary between the open grassland of Kavirondo, with its naked people, and the well-forested, hill and marsh country of Busoga, whose inhabitants, however poor they may be, are scrupulously clothed. Here one sees the grey parrot and many West African forms of Turaco in abundance. The language of the Busoga differs very little from that of Uganda, and the people are in the main of the same stock.

Busoga is separated from Uganda by the Victoria Nile, which, in its birth at the Ripon falls, gives us one of those glorious bits of scenery that make this world so hard to leave. I shall not attempt here to describe the scene, which has been frequently described before from the days of Speke onwards. The Victoria Nile loses itself for a while in the huge backwaters of Kioga, Kwania, and other lakes and marshes. Here the country is for the most part low and exceedingly swampy, and therefore very unhealthy for Europeans. Cleared of sudd, however, the Victoria Nile is navigable for steamers from a point about 55 miles north of the Victoria Nyanza all the way to Foweira, which is on the borders of the Nile province, and not far from the Albert Nyanza.

The geographical features of Uganda proper extend, as I have already said, eastwards of the Nile over Busoga. They are also continued westwards into a portion of Toro and into Ankole, and southwards into Karagwe. These geographical features consist of hummocky hills (rising here and there into lofty downs), with broad marshes intersecting this lumpy country. Over almost the whole of Uganda proper and the surrounding countries, which resemble it in appearance, there is scarcely to be seen a real running stream or river, the only exceptions being the Kagera on the south-west and the Nile on the north. Almost every watercourse is so choked with vegetation that from a height the water is not visible, and the broad river-valley seems to be a stretch of light green sward. Sometimes, however, these valleys in between the hills are filled with forest, the tropical luxuriance of which cannot be beaten in any part of Africa that I have seen. These Uganda forests surpass in splendour of vegetation and in loftiness of trees the finest forest effects I have seen on the Congo, the Cameroons, in the Niger Delta, and in Liberia. But even in these forest depths, where the valley is deepest, the water scarcely seems to flow or percolate, and

has all the appearance of stagnancy; and even here its course is almost completely hidden by the growth of weeds, reeds, grass, rushes, and zingiberaceous plants, some of these latter with splendid leaves which might take their place amongst ornamental foliage in greenhouses. Where the river-valley does not support this extravagant forest, it is completely covered with papyrus and other water-plants. These papyrus rushes will grow to a height of 9 or 10 feet sometimes from the surface of the water. The Baganda have carried across these marshes in all directions fairly solid causeways, made by driving stakes into the ground, and then constructing between these stakes a sort of corduroy road on which sand is piled.

A familiar spectacle in Uganda is the magnificent banana plantations, which constitute the main source of food-supply.

The huts of the common people are poor and untidy in appearance, and do not correspond with the relatively high position which the Baganda occupy in other respects amongst African peoples. The chiefs, however, erect buildings of reeds, palm-trunks, and thatch, which are imposing and often elegant in appearance. The Baganda are a very carefully clothed people, who are almost more squeamish about any exposure of the person than Europeans. Yet they are a much less moral race than the naked Kavirondo, though Christianity is exercising a decidedly elevating influence on their habits in this respect. This is perhaps the only adverse thing that can be said about them, for in other respects they are the most amiable and charming black race I have ever encountered. In politeness, quickness of intelligence, and appreciation of beauty, they are the Japanese of Africa. I am convinced that a very great future lies before the Baganda, if they are properly led forward in a wisely administered British Protectorate. So much, however, has been written about them and their country, that it would be a needless waste of space if I were to repeat observations which have already been made by the many who have visited and reported on this country.

I have only seen the southern part of Unyoro. It differs chiefly in appearance from the adjoining parts of Uganda in the much less frequency of swamps and in the greater rockiness of the downs. In southern Unyoro the extraordinary naked boulders which are piled one on the top of the other on the summits of hills bear the most marked resemblance to ruined castles, and are picturesque in the extreme. In western Unyoro, not far from the coast of the Albert Nyanza, there is a magnificent stretch of forest, quite West African in flora and fauna. I have seen the southern portion of this forest, and have obtained from it chimpanzees, which I have sent to the national collections. This stretch of typically West African forest extends almost uninterruptedly from the vicinity of the Victoria Nile (near its entry into Lake Albert) southwards, parallel with the coast of the Albert Nyanza (but not

reaching it), through eastern Toro, parallel with the Ruwenzori range but not joining with it, into northern Ankole. The country along the coast-line of Albert Nyanza drops abruptly from the Unyoro plateau, and is somewhat harsh in character, partly owing to the presence of salt in the soil. This harsh-looking country extends along the south end of Albert Nyanza, varied with huge marshes. About 30 miles from the lake-shore, however, in a north-westerly direction, one suddenly enters a belt of extravagant West African forest, a forest which is now quite continuous with that of the Congo. This belt of dense woodland stretches eastwards to the north-western flanks of Ruwenzori, and then turns again westwards, and leaves the Semliki flowing through a strip of country quite East African in appearance, with long grass and sparsely foliaged trees—euphorbias, etc. This is the country which characterizes the greater part of the shores of Albert Edward Nyanza, except a portion of the eastern shore, where there is another patch of West African forest, which is really a termination of the Unyoro belt. In the region between Ruwenzori and the heights of the Congo watershed—in fact, on either side of the upper valley of the Semliki—there is a great deal of East African big game; there are fan palms (*Borassus*); and there are those large vultures which are particularly associated with the steppe regions of Africa where big game abounds. A march or two to the west of the Semliki brings one to a rather high mountain range, the flanks of which are clothed in dense forest. This is the forest which stretches uninterruptedly to the upper Congo, and which crosses the lower part of the Semliki till it touches the flanks of Ruwenzori. This Congo forest, however, avoids the western shores of Albert Edward Nyanza, and trends in a south-westerly direction towards the upper Congo. The mountain range west of Albert Edward Nyanza has a most imposing appearance, possibly due to some mirage or moisture in the atmosphere, which gives the mountains an exaggerated appearance of height, so that on some days one strains the eyes to see if snow does not lie on them. This deceptive appearance has actually caused certain travellers to place hypothetical snow-peaks in this range which have no existence. The Belgians, indeed, assured me that the greatest heights of these mountains have been ascended by them, and are found not to be more than an approximate 6000 feet above sea-level. They are no doubt right. This same range, however, close to the south-west coast of Albert Nyanza, does rise to heights of over 8000 feet, and I cannot help thinking that altitudes of 8000 or 9000 feet may still be found to the west of Albert Edward Nyanza. The fauna of this mountain range is East African, and not West African. It is rather interesting to notice how sharp is the demarcation in this direction of the range of two species of buffalo. The Cape buffalo, with its large and recurved horns, still lingers in the Semliki valley outside the forest. The instant you enter the forest, however, you see individuals

or encounter traces of the Congo species of buffalo, with its greatly reduced horns and shaggy red hair.

I crossed the Semliki river opposite Fort Mbeni, and travelled for three days into the dense Congo forest. I can fully endorse all that the celebrated explorer Stanley has said about the awesome nature of these appalling woods. I can only say that the whole of my expedition, as well as myself, longed to be out of them, although we were in search of the now well-known Okapi and of other wonders, some of which were found, and some of which still remain undiscovered. I employed my time in this forest profitably by visiting the Pygmies at home, and seeing their little settlements of tiny huts constructed of withes and leaves. I also encountered here those strange prognathous, ape-like

VEGETATION ON MUBUKU RIVER, RUWENZORI, AT 8500 FEET.

people who seem to be a race of pariahs dwelling on the fringe of other tribes. They are locally known as the Ba-nande. I made some interesting discoveries about the Bantu languages spoken in these forests, and the adjoining tongues which are not Bantu, but are apparently distantly related to the Makarka, or Nyam-Nyam. I also ascertained that the real gorilla comes pretty near to the Semliki in its distribution.

I have reason to believe that other remarkable discoveries of hitherto unknown mammals will be made beside that of the Okapi. As it was, in this forest we obtained skins of several other beasts new to science. I might mention that I was accorded the kindest hospitality by the Belgian officials, and given every possible facility for visiting this portion of the Congo Free State. I found the natives everywhere on friendly terms with the Belgian authorities, and the excellent roads and

well-built stations, together with abundant supplies of the comforts and necessaries of existence from Antwerp merchants, introduced a strange element of civilization into these otherwise trackless wilds. Sir Henry Stanley would indeed be amazed at the change which has taken place in parts of the forest which some twelve years ago were to him and his expedition more remote from civilization than the north pole.

Regarding the Pygmies, I might mention that I have examined individuals from several different parts of this northern province of the Congo Free State and from adjoining British territory, for a few Pygmies dwell within the limits of the Uganda Protectorate in the Mboga country. As the result of my inquiries, I have come to the conclusion that there is no special Pygmy language; that each section of Pygmies speaks more or less imperfectly the language of the tribe of forest Negroes with which it most associates. Thus, some of the Pygmies speak the corrupt Bantu dialect of the Babira, while others speak such languages as Mbuba, Lega, and other tongues that are not Bantu. The Pygmy pronunciation, however, is constantly punctuated by little gasps which take the place of consonants, and which have a far-off resemblance sometimes to the South African click. They also speak with a musical pronunciation that is strongly cadenced. My measurements of the Pygmies and other particulars I shall have to reserve for the *Journal of the Anthropological Institute.*

The south-western part of the Uganda Protectorate consists of the district of Ankole. A portion of this noble country rises to heights of 8000 and 9000 feet, and here reappears the alpine vegetation of Ruwenzori, Elgon, and the Nandi plateau. Amongst these mountains are scattered almost innumerable crater-lakes, which provide landscapes of exquisite beauty. I shall never forget my first glimpse of one of these basins of sweet, clear blue water. We were at the end of a long and very weary march, and I was ardently desiring to find water for the thirsty men, so that we might camp and rest. We had been constantly ascending, and I had looked out in vain for any rill or rivulet. At last my guide said water was quite close, and proceeded to commence the ascent of an extremely steep cone covered with short turf. I followed in perplexity, reached the edge of the cone, and suddenly looked down a few hundred feet into a lakelet which was an absolute mirror of banana-covered shores. Some of these crater-lakes look as if two craters had coalesced. They are of rather large size, swelling out here, narrowing there, and swelling out again. They nearly all contain fish. The scenery round them is so extravagantly beautiful that I feel that—coupled with the fact that they are in a country possessing a very healthy climate and few inhabitants—they may some time become the seats of small European settlements.

The southern part of Ankole is somewhat dryer and less equatorial in climate. It has a more parched appearance, at any rate, during the

dry season, and it falls in altitude. Here there is a certain amount of big game, including buffalo, rhinoceroses, and eland. The people of Ankole, as is well known, consist of a race of sturdy Negroes—the Ba-iro—and an aristocracy of Ba-hima, who are, as Speke, their original discoverer, guessed at once, obviously descended from a Gala, Somali, or other Hamitic stock. As regards features and complexion, one often sees men and women amongst the Ba-hima who are more like Egyptians than is the case with the Galas and the Somalis. But, strange to say,

SENECIO (? *JOHNSTONI*) ON RUWENZORI AT 12,500 FEET, DRAPED WITH *USNEA* LICHEN.

the hair of the head is much more woolly and Negro-like than is the case with Galas and Somalis. I have seen some men and women so light in complexion that I actually thought they were some of Emin Pasha's refugee Egyptians, until it was proved to me that they had been born and bred in Ankole. These people, no doubt, are the origin of many of the legends of a white race dwelling in Equatorial Africa. Amongst many other points, they are remarkable for their domestic cattle, which have more or less straight backs, are of large size, and have

enormous horns. The horns sometimes remind one strongly in shape of those of the Bibontine section of Asiatic wild oxen. On the whole, the breed agrees remarkably closely with the long-horned cattle depicted in the Egyptian frescoes, and I believe that this race is the stock from which the long-horned South African cattle were derived.

I conclude this already too lengthy paper with an account of my exploration of the Ruwenzori range of snow-mountains.

Ruwenzori is still the most mysterious and least-known mountain of Africa. Its existence as a snowy range, or a single snow-peak, was reported by Stanley on native information as far back as 1875, though, curiously enough, at that time he does not seem to have attached sufficient importance to the natives' stories of snow, which he repeats without comment. Yet he himself stood, in 1875, close to the eastern flank of this mighty mountain mass, and spent days if not weeks within sight of it. The whole time, however, the upper regions of the mountain remained completely veiled in clouds, and Stanley vaguely estimated an altitude of 15,000 feet as the possible climax of this imperfectly outlined mass of blue mountains. All the time Sir Samuel Baker, Gessi Pasha, and other explorers or officials of the Egyptian Sudan were navigating Albert Nyanza, the snow-summits of Ruwenzori remained obstinately concealed behind banks of clouds. Sir Samuel Baker was struck with the apparent size of the great mountain mass which lay to the south of his newly discovered lake, and he gave it the name of the Blue mountains. When Stanley reached the vicinity of the south-west corner of the Albert Nyanza in 1887, he got a sight for the first time of a snow-peak, or indications of a snowy range of mountains, to the south-east of his position. Questioning the Bantu-speaking populations at some time or other when in the vicinity of this new discovery, he believed the most general native name for it to be Ruwenzori. Unfortunately, this term is nowhere recognized by the natives. The nearest approach to it seems to be, on Dr. Stuhlmann's authority, the Lukonjo word *Nsoro*. This, with the Lu- or Ru-prefix would be *Runsoro*, and it is obvious that Stanley unconsciously extended the pronunciation into Ruwenzori. In the Nyoro (Urunyoro) language the snowy part of the range is called *Enchurru*, which is probably a variant of the same root as the Lukonjo *Nsoro*. It is only on the authority of Stuhlmann, one of the few really careful observers and writers who have visited this region, that I give this explanation of the name Ruwenzori. I have made a very careful study myself of the Urukonjo language,* and the nearest I can get is *Nsororo*, which with the plural prefix *esi* (*esiansororo*) means "snow" or "snows." As a matter of fact, Ruwenzori is more often called by the Bakonjo

* Because it comes almost closer than any other tongue (except Lugesu) to the conditions of the Bantu mother-language, from which all the other dialects diverged.

who inhabit its southern half *Obweruka*, and by the Banyoro, who are the native rulers of the country, *Ebirika*. By the Ba-amba who dwell on the north-western flanks, and whose very name means "People of the Heights," it is called *Gusia*. By the people speaking corrupt Bantu dialects on the north-eastern edge of the Congo forest it is styled *Tudu*. The Baganda call this mountain range *Gambaragara*. The people dwelling to the south of Albert Edward Nyanza, who speak variants of the widespread Nyoro speech, appear to call the mountain *Gularo*. Amidst all this diversity of names, it is perhaps best to retain Stanley's somewhat incorrect version of Ruwenzori, though if only the spelling of this word could be reduced to Runsori, it would correspond more closely with one of the native designations.

After my own experience in regard to this mountain I am no longer surprised that explorers like Stanley in his first visit to these countries, like Emin Pasha, Sir Samuel Baker, Gessi, and all others who visited these regions prior to 1887, failed to discover in the "Blue mountains" south of Albert Nyanza what is probably the highest point of the African continent, and what is certainly the greatest extent of snow and glaciation in Africa at the present day. I was within sight of Ruwenzori for three months and a half during my investigations of the Western Province of the Uganda Protectorate and of the adjoining regions of the Congo Free State, and only six times did I see the snows, except, of course, that period of a week during which I was more or less on the snow. And out of all these times when, in the early morning or late evening, I caught sight of the snow, I only once saw without intervening cloud the whole snowy range. On this occasion, unfortunately, the photographs which I took came out with plenty of foreground and practically no indication whatever of the snowy panorama behind; and the period during which the continuous range of snow was visible was too short for a sketch of any value or accuracy to be made.

The same fate appears to have attended all my predecessors who were armed with a camera, a pencil, and a notebook, with the exception perhaps of Dr. Stuhlmann, who in his book gives us a sketch of the distribution of snow on the western aspect of the mountain. Even this sketch, however, is not a complete record of the entire range of snow-peaks. For myself, piecing together as correctly as I can all my separate sketches and photographs of each of the peaks covered with snow or glaciers which I saw separately, I have arrived at a result which may give an approximately correct representation of this snowy range as seen from the east. But this drawing, being intended to show the actual extent of snow, is taken from an imaginary standpoint to the east-north-east of Ruwenzori, which would be of an altitude nearly as high as the range itself. It does not represent the actual aspect of the mountains from any accessible point of view to the east of it, because from the lower altitudes of Toro parts of the snow would be cut off by

intervening heights forming parallel ridges or divergent spurs of the main mass. Ruwenzori is certainly, of all African mountains of my acquaintance, that which is the most constantly cloud-covered. For a month or more at a time no glimpse may ever be obtained of the snow. I am told, however, that I visited this region at the worst time of the year for my purpose, and that I should have had much better luck with regard to seeing the snows during November and December, which are said by residents to be the months of the clearest skies. With regard to the highest point of this range, the selection would appear to lie between the peaks known to the natives as Kiyanja and Duwoni. These would be apparently the Semper Berg and Weismann of Stuhlmann. I must say, however, that I strongly object to christening the heights of Ruwenzori for all time with the names of German worthies like Kraepelin, Semper, Weismann, and Moebius, who are not all of them of world-wide reputation (however much they may be esteemed in their own country), and who have had absolutely no connection whatsoever with Africa or with Africa's highest mountain. The preferable plan would be the search in the first place for clearly defined and easily pronounced native names, and in the event of these not being obtainable, to christen the separate peaks of Ruwenzori with the names of Stanley, Stairs, Emin, Bagge, Moore, Elliot, and Dr. Stuhlmann himself—of explorers who from time to time contributed their share to the exploration of this Caucasus of Central Africa.

I am personally convinced that the highest point of Ruwenzori is not under 20,000 feet in altitude, and that it will therefore be found to attain the greatest altitude on the continent of Africa. There must be over 20 miles of almost uninterrupted glaciers along the highest part of the ridge, and this under the Equator must pre-suppose a very considerable altitude. Apart from which, when, after the most arduous climb I have ever experienced, I reached my highest point on the flanks of the snow-range—14,800 feet—the mountain above me seemed a thing I had only begun to climb, and towered, so far as I could estimate, another 6000 feet into the dark blue heavens. Permanent snow, however, lies as low as 13,000 feet, which also is the lowest point to which any glacier reaches, so far as my limited investigation extends.

To effect a complete and successful ascent of the highest points of Ruwenzori requires as elaborate a preparation as the exploration of the Andes or Himalayas. An enormous deal remains to be done in the exploration of this the most important range of Africa. Hitherto we have had mere peeps at this series of snow-covered heights. The only Europeans who have as yet topped the snow of Ruwenzori are Mr. Bagge (formerly collector for the Toro district), Messrs. Moore and Ferguson, and myself and my two companions, and we have only touched it at one spot, the head of the Mubuko valley. Ruwenzori is no Kilimanjaro or Kenia, no single snow-mass. It is a chain of heights like

the Caucasus, with considerable intervals between the principal masses of snow and ice. The snow-peaks of this range probably extend over a distance of 30 miles from north to south.

The obstacles which prevented myself and other explorers from reaching the highest points of Ruwenzori were, firstly, the distances to be traversed at high altitudes, with a temperature not far off freezing-point; the extremely arduous nature of the last part of the climb, where precipitous walls of rock or ice require an alpine equipment for their ascent; the non-existence of any guides whatever above snow-line; and deficiency in the means of transporting the necessary means of shelter and supplies of food. Above 13,000 feet it is difficult to see where shelters could be formed or tents pitched which would protect the explorer from the severe cold prevailing at night-time, as the rocks and glaciers were so precipitous. Even between 13,000 and 9000 feet it is extremely difficult to find a dry spot on which to pitch a tent or to build a hut. The ground above 9000 feet and up to the snow-level is almost everywhere either bare rock or wet moss, sodden vegetation into which one may easily sink to the knees. This belt round the mountain is simply a sponge, over which it is impossible to pass dry-shod. Mr. Bagge, formerly collector for the Toro district, and now sub-commissioner for the Nile Province, deserves credit for making a rough corduroy road, with the help of the natives, over this marshy belt between 9000 and 13,000 feet; but even he could do little to mitigate the difficulties of the ascent in many places. After going nearly all round the base of Ruwenzori, from the north southwards to the north-west, during the months of June, July, and August, I made arrangements in September to attempt the ascent of the higher snow-peaks by way of the Mubuko valley. The natives had informed Mr. Bagge that the Mubuko valley was the only possible means of reaching the snow by any ordinary feats of climbing, and it was due to guides furnished by Mr. Bagge that Messrs. Moore and Fergusson were enabled to make their partial ascent in this direction. I followed along the same route. After passing through tropical scenery of the usual luxuriance to be expected in a well-watered part of Equatorial Africa, I reached a little Mukonjo village called Bihunga, at an altitude of 6800 feet. From this point a superb view could be obtained up and down the Mubuko valley, and one faced a long serrated ridge of densely forested mountains, which are a very prominent feature on the eastern aspect of the Ruwenzori range. They look at a distance like a sierra or comb, which acts as a jealous screen to hide the snow-range. As, approaching the mountain in this direction, they serve as the awful portals of the snow—I call them awful because they are so, rising up precipitously thousands of feet above the narrow river-valley into cloudland—I venture to call them the Portal peaks, and this name will also serve to commemorate the services of Captain Raymond Portal, the brother of Sir Gerald Portal, whose

political work in the Toro district, short though it was, has proved of inestimable benefit to the country, and, curiously enough, has had much more important results than the mission of his more celebrated brother, which resulted in no settlement at all of the Uganda questions.

The following may be a useful summary of the general character of the vegetation on the slopes of Ruwenzori between 6000 and 15,000 feet. At 6000 feet draccenas and tree-ferns mingle with the tropical forest. A large daisy growing in the grassland has a strangely northern look. Buttercups and forget-me-nots also make their appearance at this altitude, though they are not abundant until 7000 feet is reached; tree-ferns do not ascend above 7000 feet. At this altitude the forest begins to lose its tropical character, and a conifer, *Podocarpus*, makes its appearance, and ranges between this height and 10,000 feet. I noticed on Ruwenzori no species of juniper, though I have seen junipers on Elgon and all the eastern heights of the Uganda Protectorate. I do not know if this conifer, so common in Abyssinia and on the high mountains of Eastern Africa, is absent from Ruwenzori. The podocarpus tree is an extremely handsome one; the leaves are much longer than in the yew, so long that they almost look like the foliage of the eucalyptus. The old leaves are a rich, dark, glossy green, and the new leaves a vivid yellow-green, so that the foliage is full of colour, the more so as the catkins and cones are a lovely mauve-pink. The podocarpus gives out a smell exactly like the English yew. The tree must grow in places to 70 or 80 feet in height. One species of tree-heath begins at 7000 feet and ascends to 9000 feet. An enormous species with slightly larger leaflets replaces it at 9000 feet and ascends to 12,900 feet. Bamboos begin at 7000 feet and ascend to 9000 feet; proteaceous shrubs begin at 7500 feet and ascend to 12,000 feet. A species of hypericum, very like the English St. John's wort with yellow flowers, begins at 8000 feet and ascends to 10,000 feet. At 10,000 feet a fine hypericum, growing as quite a tall tree, makes its appearance. This has very large flowers, with a calyx that is bright yellow inside, but vivid crimson on the outer side of the petals. Between 7000 feet and 9000 feet the Abyssinian violet grows abundantly. Moreover, there is a bramble, the flower of which is strangely similar to that of a wild rose. This bramble has a large fruit like an English blackberry. Another bramble or raspberry has a fruit the size of a strawberry, but in appearance somewhat like a hop. Umbelliferous plants, like wild carrot or hemlock, grow luxuriantly between 8000 and 11,000 feet. A senecio, or giant groundsel (exactly like *Senecio johnstoni* of Kilimanjaro, but, I am informed, a species new to science), commences at 9500 feet and grows at least as high as altitudes of 15,000 feet. *Habenaria* ground orchises grow from 9500 to 11,000 feet. A flower very like the English "lady's smock" grows between 8500 and 12,000 feet; a white flower of the cabbage order grows under cliffs at 12,500 to 13,000 feet.

Perhaps the most remarkable feature in the vegetation of the upper parts of Ruwenzori are the lobelias. These are of two kinds, and are so utterly distinct one from the other in form that no one but a botanist would know that they were closely related. One of these lobelias, perhaps offering two separate species, begins to make its appearance above 7000 feet, and continues (or else reappears again in a closely allied form) right up the mountain to the very verge of the snow, and in places without snow to 15,000 feet. This lobelia grows exactly like a dracœna. As the plant shoots upwards the lowest leaves fall off the stem, leaving it round and smooth, so that when the plant has attained its maturity it exhibits a large bunch or mop of sword-like leaves at the end of a woody stem of small diameter, and about 20 feet and over in height. From the middle of the mop of leaves there starts a flower-spike, which may be as much as 3 feet in height. This is at the same time very slender, and is covered throughout the whole of its length with blossoms concealed from sight by large green bracts. The blossoms, when examined, are found to be of a greenish-white, inclining to red. The other kind of lobelia is similar to one existing on Mount Kenia. Its general appearance is best described by the accompanying illustration (p 32). It reaches to a total height of about 15 feet above the ground. The flower-stalk is sometimes nearly 6 feet long, and is much thicker and larger than the first described lobelia. The green bracts to a great extent conceal the ultramarine-blue flowers, which grow at right angles to the stalk, though when the flowers are absolutely mature they reveal for a day or two an exquisite shimmering of blue all up and down the stalk. These lobelias with their aloe-like leaves and strange flower-columns remind one, I cannot say why, of monuments in a cemetery. They would certainly be handsome additions to our ornamental flora. I have already alluded to the senecios, or giant groundsel, on the upper parts of the mountain. I am informed by the authorities at Kew that the specimens I have sent home show this to be a new species, but in outward aspect it scarcely differs from the giant senecio which I discovered on Kilimanjaro. Like that plant, it grows to a height of over 20 feet, and has broad, bright green leaves like a cabbage, or even in some aspects like a banana. The flower-stalks grow above the leafage to the extent of perhaps 2 feet, and their masses of flowers are a dull amber-yellow. The plant would be handsome but for the swollen, gouty stem. Very often, however, all the lower part of it is exquisitely draped by long fringes of the *Usnea* lichen, and then it is a really beautiful object in the landscape.

A description of the upper parts of Ruwenzori would not be complete without an allusion to the extravagant development of mosses on the tree-trunks between 11,000 and 12,000 feet. This growth of moss is extraordinarily thick. Perhaps it would give a depth of 18 inches

before the stem or trunk on which it grows was reached by a probing instrument. A portion of one's road up the mountain lies for perhaps 2 miles over a constant succession of prone tree-trunks. For ages past tree after tree in this wintry-looking forest has fallen from old age or in storms, to lie prone where it fell, apparently without insects to turn its wood to powder. On the contrary, this wood becomes hard like bog-oak, and is covered with this thick growth of moss. But the moss makes these tree-trunks most deceptive and dangerous to step on, as it

A STRANGE GARDEN. LOBELIAS GROWING AT 11,500 FEET (RUWENZORI).

is so lightly attached that it slips away from under the foot, and the incautious traveller may fall and hurt himself most cruelly against the jagged branches of the trees, which have been turned to a flinty hardness. But these mosses give one a perfect feast of colour. They range in tint from lemon-yellow up through all the gamut of yellows and browns to a deep rich red, a red which at times has almost a purple tinge. Sometimes the moss is almost an emerald-green, and the limbs of the same tree may display every shade ranging between purple-red and grass-green, a large proportion of the colours being shades of

orange and yellow. Yet the forests of this cold zone of Ruwenzori at a distance fuse their tints into rather a dreary tone of drab-green, and the long streamers of the greenish-white usnea give the vegetation a singularly dismal aspect. It is, perhaps, at about 9000 feet that the European traveller feels most at home, as at that altitude many of the flowers, and not a few of the trees and ferns, recall to him the woods of his own country.

Leopards ascend the mountain to the very verge of the snow, and we actually found a leopard's footprints in the snow at 13,400 feet. The trades of a large serval cat, probably the Servaline, were found at 12,500 feet. There are two kinds of Hyraxes on Ruwenzori at least, if not

SNOWS AND GLACIERS ON SOUTH SLOPES OF MOUNT DUWONI (MUBUKO VALLEY), RUWENZORI. TAKEN FROM 12,500 FEET.

more, and they also ascend to the snow-line. Bats were found up to 13,000 feet. Chameleons were found up to 11,000 feet, and a whitish moth fluttered about over the snow. A large eagle owl was seen, but not secured, at an altitude of 13,000 feet; and at this height a common bird was a kind of starling with a fan-shaped tail, very similar to one which we saw and obtained at 7000 feet on Mount Elgon. We saw elephants on Ruwenzori, but not higher than 7000 feet. Monkeys do not appear to go above 9000 feet. A few rats were obtained not far from the snow-line, and francolin, very partridge-like in appearance, were met with as high as 13,000 feet.

The rocks in many places are very micaceous. In some of the

caverns which I am about to describe, the overhanging roof of rock was like tarnished silver, and had much the appearance of the beautiful aluminium ceiling to be seen at Sir Alma Tadema's house at St. John's Wood. A good deal of granite crops out between 10,000 and 11,600 feet. Many of the stream-valleys exhibit rocks that are almost jet black in colour, with white veins of quartz.

Among the volcanic foothills of Ruwenzori which fringe the northern and eastern borders of the mountain range, there are so many crater lakes that I have hardly been able to keep account of the number visited or seen. All of these, with one exception (so far as my knowledge goes), are not situated at altitudes much above 5000 feet. But there is one crater-lake which must be at an altitude of 8000 feet, and which is situated on the southern side of the Mubuko valley. This is the highest and nearest to the snow of any obvious evidence of former volcanic action which I have come across on Ruwenzori.* Although I am not a geologist, I am quite disposed to agree with Mr. Scott Elliot, who I think was the first to point out that, although Ruwenzori exhibits traces of volcanic activity on its outskirts, it is not, as a mountain range, of volcanic origin like Kenia or Kilimanjaro. On the eastern side of the mountain, and for aught I know on the western side likewise, permanent snow lies at the relatively low altitude of 13,000 feet. After heavy showers of rain in the lowlands, freshly fallen snow may be seen on the lower heights of Ruwenzori at 11,000 and 12,000 feet, but it does not lie very long; whereas snow lies in patches more or less permanently at 13,000 feet. The lowest point of the lowest glacier that we visited was 13,200 feet in altitude, but evidence of glacial action in the valleys extended 3000 feet lower. The thunderstorms which are of such frequent occurrence along the lower slopes of Ruwenzori, do not appear to mount higher than 9000 feet. Above that altitude rain falls finely—not in heavy drops—but every day. Rain often turns to hail, sleet, or snow at 13,000 feet.

From Bihunga, the last permanent habitation of man in the Mubuko valley (the exact altitude of which was 6858 feet),† we ascended along a native path to a camping-place underneath a huge rock at the head of the left branch of the Mubuko valley. The altitude here by boiling-point was 9762 feet.‡ This was the first of the extraordinary series of rock-shelters which served as camping-places to Europeans and natives ascending the mountain by means of the Mubuko valley. The camping-places consist of small areas of absolutely dry soil under an over-reaching cliff of micaceous rock. Two yards, 3 yards, 4 yards away from the

* I have visited two of the seven or eight hot springs found on the lower slopes of Ruwenzori, between 6000 and 4000 feet.

† Water boiled at 200°·1 Fahr.; temperature, 58°.

‡ Water boiled at 195°·1 Fahr.; temperature, 52°.

shelter of the overhanging ledge the ground is an impossible bog. Immediately under the arch it is bone-dry. However convenient, I doubt if there is permanent safety under these rock-shelters, since it would seem as though from time to time fragments of micaceous rocks detached themselves from the overhanging roof. In this way these cliffs are probably crumbling away by degrees at their base, infiltration of water from the bogs above no doubt being the cause. From this second camp, which was called by the natives Kichuchu, we had a most

UPPER MUBUKO GLACIER, RUWENZORI, WHICH DESCENDS TO 13,100 FEET.

arduous climb, sometimes dragging our bodies up the bed of a small torrent, and being nearly drowned in the process. For miles we walked, as I have already said, along slippery tree-trunks, often unable to see through the crevices any solid ground beneath us. At length we reached the edge of the upper valley of the Mubuko river, and found for a couple of miles or more a charming tract of flat country like a beautiful swampy garden. Here, too, we found the largest of these rock-camps under huge, overhanging cliffs. This other camp was called

by the natives Buamba, which really means "up above," "*the* height" *par excellence*. The altitude of Buamba camp was 11,447 feet.* The next day we climbed for a little under two hours, and reached the last of the rock-shelters at an altitude of about 12,500 feet. From or near here we obtained suddenly a splendid view of the snows of Ruwenzori. Looking up the main Mubuko valley, we saw a fine panorama of snow-fields and glaciers; but westwards appeared to be the highest point of Ruwenzori, a huge black knob rising out of the snowfields of unruffled purity and dazzling white. From the last of the rock-shelters we directed our steps towards where the ascent of the snow-range seemed most practicable, namely, the Mubuko glacier. The altitude of the base of this glacier was 13,191 feet.† We found it was impossible to climb higher in this direction without more elaborate preparations than we had made in the way of ropes and axes, so we returned for a while to Buamba camp to rest and botanize. Next day, instead of attempting the ascent by way of the Mubuko glacier, we probably followed the same route as Mr. Moore, and tried to ascend the mountain more or less midway between the Mubuko glacier and the highest peak, the peak which the natives call Kiyanja. In this way, after difficulties of the most exhausting nature and in the middle of a snowstorm, we reached an altitude of 14,828 feet,‡ and here we were obliged to stop. My two European companions (Mr. Doggett and my English servant Vale) were fairly exhausted with the cold, and perhaps with a touch of mountain sickness. Still more serious, our native Bakonjo guides and our Swahili porters were positively ill with the cold, in spite of our having clothed them in warm jerseys, coats, and blankets. The condition of some of the natives, in fact, was so bad that I am sorry to say one of them eventually died of pneumonia, and all were so ill that I dared not stop any longer at this altitude under such inclement conditions. We therefore returned once more to camp. The next attempt we made at an ascent was again in the direction of the Mubuko glacier. We were confronted here by a wall of rock about 7 feet in height, which at first seemed difficult to ascend, until the idea occurred to me of using my very tall Sudanese orderly as a human ladder. Mr. Doggett mounted on his shoulders, and managed to scramble over the ledge above. He then fastened a rope on boulders, and we each dragged ourselves up. After this we had to pass through a natural tunnel in the rock, which had been bored by a stream flowing from the glacier. As the tunnel was partly filled up by the stream in question, which was icy cold, this passage was very disagreeable. By one means or another we reached an altitude of 13,534 feet § on this glacier, and here our further progress

* Water boiled at 192°·2 Fahr.; temperature, 47°.
† Water boiled at 189°·3 Fahr.; temperature, 47°.
‡ Water boiled at 186°·6 Fahr.; temperature, 40°.
§ Water boiled at 188°·5 Fahr.; temperature, 37°.

was barred by walls of ice at least 50 feet in height, and absolutely precipitous. We did a good deal of photographing here, but on our descent, Mr. Doggett became so ill from the cold and the wetting with the icy water that we were obliged to return to our permanent camp. The next day I made another abortive attempt to ascend the mountain, but illness was beginning to tell on all my companions, black and white, and I was afraid, if I did not descend to a warmer climate, there would be no one but myself left to tell the tale. Pneumonia seemed to afflict many of the men, and the disease made such rapid progress that the patient was almost beyond recovery before attempts could be made to arrest the malady. In this way we lost the best of our native guides,

ICE CAVERN, MUBUKO GLACIER.

to my very great regret, and two of our Swahili porters. For myself, I can only say that the short stay amid the ice and snow of Ruwenzori seemed to do my health as much good as if I had been to England. I had had a very severe attack of hæmaturic fever in Uganda before starting for Ruwenzori, but my visit to the mountain completely restored me to health and vigour.

The whole time of our stay on Ruwenzori the weather was, with very few and brief exceptions, atrocious. It rained constantly, and at high altitudes it snowed and hailed. The arrival of clouds had about it something positively alarming to our black followers and to the two Europeans accompanying me, who had had no previous experience in mountaineering. The clouds would come rushing up the Mubuko

valley like express trains one after the other, and they did not appear as vague mists, but as bodies of singular definiteness of outline which constantly seized and involved you as in a thick blanket. You might be sitting for a few minutes in brilliant, welcome sunshine, looking at the blazing white snowfields and the minutest detail of the rocks and boulders. Suddenly an awful greyish-white mass would come rushing at you, and everything would be blotted out. Even your companions 4 or 5 yards off were scarcely visible. Although I told myself there was no danger in this, the effect on the spirits was singularly depressing and alarming, especially as this occurred in dangerous bits of climbing. Sometimes a thick bank of cloud would enfold you for a quarter of an hour.

On neither side of the flanks of Ruwenzori, except perhaps on the extreme north-west corner, do the tropical forests quite attain the same extravagant development of vegetation as the never-to-be-forgotten Congo or Uganda forests. This Congo forest, which Stanley first made known to the world, has an appearance and aspect of its own which it is very difficult to describe. This type of forest, besides extending right away to the West Coast of Africa, reappears in a long strip at some distance to the east of Ruwenzori, running almost north and south from Unyoro into Ankole, and being continued with a few breaks through the western part of Unyoro more or less parallel with the east coast of the Albert Nyanza. This forest is obviously of the same character in flora and fauna as that of the Congo. It possesses chimpanzees, and most of its prominent mammals and birds are West African in type. On the western flanks of Ruwenzori, except at the north-west corner, although there is dense forest where the mountain begins to rise from the undulating plains, there is no sign of tropical luxuriance. On the contrary, from the base of Ruwenzori on the west to the Semliki river and beyond it is more or less open grassland, dotted with thorn trees and a few borassus palms. This grassland appears to extend right across the upper half of the Semliki to the lofty mountains which separate the watershed of the Semliki Nile from that of the Congo, and which encircle the western side of Albert Edward Nyanza. About halfway down its course, however, the Semliki suddenly enters a remarkable prolongation of the Congo forest, which, as it were, flows over this mountain range in a great black stream of dense woodland, and just touches the north-western corner of Ruwenzori. In this Semliki forest (which is absolutely continuous with the Congo forest), there are Pygmies, and there also exists that remarkable ruminant, the Okapi.

The negro tribes which inhabit the flanks of Ruwenzori are the Ba-konjo, the Ba-nande, the Ba-amba, and the Ba-toro. The Ba-toro are the same as the Ba-nyoro; that is to say, they are a mixture of more or less average Negroes and of that quite superior race the Ba-hima,

a race in origin the same as the Gala, the Somali, and perhaps the mainstock from which the ancient Egyptian sprang. The Ba-konjo inhabit the slopes of the mountain range in its southern half, that is to say, from the northern shores of Albert Edward Nyanza and the heights of the Congo watershed right round the southern end of Ruwenzori to the vicinity of Lake Dweru on the east. In appearance the Ba-konjo are rather a pleasing race, not offering any very distinct signs of Hamitic blood, but rather a well-developed, comely race of purely Negro stock. They are interesting more especially from the fact that they speak a Bantu language which approaches nearer than any, except perhaps one, to the form of the original Bantu mother-tongue. The only dialect which I have met with which is even more archaic is the Lugesu, spoken on the west side of Mount Elgon. It is, however, rather a moot question in my mind at present which is the more archaic in form, the tongue of the Ba-konjo, or that of the Ba-gesu of west Elgon. The Ba-konjo are a great deal mixed up with the Ba-nande, so that very often a Mu-nande classes himself as a Mu-konjo. The main distinction between seems to be that the Ba-nande are the people of the plains of the Semliki valley and of the border of the Congo forest, while the Ba-konjo are the mountain people of Ruwenzori and the heights to the west of Albert Edward Nyanza. The Ba-nande seem to be a race of pariahs, living on the outskirts of stronger tribes, and speaking the language of the tribe with whom they dwell. They are obviously the same as that ape-like people seen by Messrs. Grogan and Sharpe in the vicinity of Albert Edward Nyanza. I was certainly struck with the very low type of their heads. But this simian type of Negro crops up in many other parts of Africa, though the strain may be more obvious in this long-isolated district. The Ba-amba are not a race of particularly low appearance, though their stumpy legs deprive their figures of that well-proportioned appearance characteristic of the Ba-konjo. The Bantu dialect spoken by the Ba-amba is of the greatest interest in guessing at the origin of this remarkable family of languages, but it would be perhaps fatiguing if I commenced a dissertation on it here. Though thoroughly Bantu, it is absolutely unlike Lu-konjo, while Lu-konjo, on the other hand, is closely allied to the languages of Unyoro, Uganda, and Kavirondo. Although the Ba-konjo and Ba-amba tribes meet on the flanks of Ruwenzori, if their origins were in any way connected with the languages they speak, they must have followed widely different lines of migration before they met at this point of Africa.

Before the reading of the paper, the PRESIDENT said: It is now just seven years since we had the great pleasure of welcoming our old friend and associate Sir Harry Johnston in this hall, and of listening to his graphic account of his Nyasa government. We again have the pleasure of giving him a welcome on his

return from Uganda, and I will delay no longer in requesting him to address the meeting.

After the reading of the paper, the following discussion took place:—

Sir H. M. STANLEY: I have come wholly unprepared to say a single word to-night, and as it is a very late hour, I think that will be a legitimate excuse for me to be as brief as possible. With regard to what Sir Harry Johnston has said, I am sure I can have nothing to say but what is highly complimentary. It is twelve years now since I left that region of which he has shown a number of photographs, and I have been wishing and hoping and praying that some sensible man would go into Africa and explore that region of Ruwenzori thoroughly, so that something definite, something interesting, something of value would be found. Sir Harry Johnston has really surprised me by his beautiful photographs of Ruwenzori, and he only excites in me more the dear wish that some person devoted to his work, as Sir Harry Johnston has evidently been devoted to it, some lover of Alpine climbing, like Sir Martin Conway, for instance, would take Ruwenzori in hand and make a thorough work of it, explore it from top to bottom through all those enormous defiles and those deep gorges. Let him be a botanist, let him be a geologist, let him be a zoologist, but let him do his work thoroughly, and come back to the Geographical Society here, and let us all welcome him. Then as regards Sir Harry's allusions to the various languages of Africa, I will not say a single word, because I am afraid we should fall foul of one another upon one small portion of the discussion. I must say that, though I admire the photographs very much indeed, it seems to me Sir Harry has been unfortunate enough to pick out the ugliest dwarfs he could find in order to photograph them. There were one or two there who bore a faint resemblance to the Queen of the Pigmies that we found in the Central African forests. I am sure if we could have carried that little queen away and planted her here, it would be seen that she did not possess those lips, those distended nostrils and high back head which the photographs of Sir Harry have represented, and that these photographs were a libel on that beautiful little queen. With regard to all the rest, however, I can only consider that Sir Harry has done his work wonderfully well. It was said by a famous English orator that there was no acre in the wilds of Siberia, or on the shores of the Mississippi but when cultivated added something to the extent of civilization, and expanded the markets for British industry. How much might we not say with regard to Sir Harry, who can show what he has done in Lake Nyasa, in East Africa, and lately in Uganda? I am sure that all those countries are better, nobler, more aspiring since Sir Harry has been there, and I hope the Foreign Office will always have highly scientific, cultivated, amiable—even though they be a little cynical now and then—gentlemen like Sir Harry Johnston. And now let me voice the common feeling of this large and distinguished assembly here this evening, and let me, in their names as well as in my own, congratulate you, Sir Harry, upon your promotion to the Grand Cross of St. Michael and St. George. I hope there are other fields awaiting you, sir, and that before I die I shall see you with a still higher rank, as His Majesty Edward VII. knows well how to appreciate talent, administrative ability, and fidelity.

Mr. J. E. S. MOORE: If I may, as a fellow-traveller with Sir Harry Johnston in Central Africa, I should like to say a few words about the Ruwenzori mountains, which I had the opportunity of examining before Sir Harry Johnston's trip. It seems to me that Sir Harry Johnston has added materially to our knowledge of these mountains in every way; he has given us some magnificent photographs and some charming descriptions of the scenery which occurs there. But I should also like to point out that it seems to me Sir Harry Johnston is a little

unfortunate in having stated here and elsewhere (the *Graphic*) that he thinks that Ruwenzori is one mountain, and that it is the highest mountain in Africa, and also in his description of the way in which it was explored during recent years. Well, in regard to the first matter as to whether it is the highest, that is simply a question of opinion; we cannot, as Sir Henry Stanley has pointed out, at present say which is the highest portion of Ruwenzori, or what the height of several of the peaks may be; this may be 20,000 feet, or 40,000 feet, but nobody at present can say what height it is. All we know is that Sir Harry Johnston reached an altitude of 14,800 feet, and I reached an altitude, as far as I can tell, working it out carefully, of 14,900 feet, but we were not in the same place. Sir Harry Johnston pointed out, in the very beautiful view he gave, that the Mubuko glacier was the point I ascended. That was not so. There is a long snow-ridge which runs between that point and the broad glacier Sir Harry Johnston reached. Along this ridge there was a V-shaped rock, which I ascended, and it was on the top of this ridge that we reached our highest altitude. Of course at that time I was not, as Sir Harry Johnston has stated, with Mr. Fergusson at all; in fact, he went there some three weeks afterwards, and Mr. Bagge was some weeks after him. At the time I was quite alone with twenty men. I think Sir Harry Johnston has not drawn sufficient attention to the fact that Ruwenzori is by no means a single mountain. It is as absurd to speak of going up Ruwenzori in the singular as it is to speak of going up *the* Alp. Ruwenzori is an immense range, probably at least 80 miles long, and there are numerous peaks, and therefore it is quite impossible for any one to describe it correctly as a single mountain. As Sir Harry has pointed out, it is quite true that the so-called Saddle mountain is very rarely seen—unquestionably it is very high indeed, and I have a very strong impression, from the views I got, that it is a good deal higher than the others, but I have also a strong impression that even this mountain is not much over 16,000 feet.*

Dr. Bowdler Sharpe: At this late hour I do not feel that I can say very much about Sir Harry Johnston's zoological collection. It is a very important one, especially with regard to the discovery of the new animal, the Okapi. Dr. Christy, who has done a good deal of exploration on the Niger, tells me that on going up the Benue river, he heard of a strange animal being found in the forests. It may not be the Okapi itself, but it may be some animal like it, and as the forest is all part of the same West African system, so I think it is quite possible that we may find the okapi extending further to the west. Sir Harry discovered one of the most beautiful Turacos which it has been my lot to see for many a long day, and I dare say many of you have seen it, as it was exhibited for some time in the hall of the Natural History Museum. The Okapi is now in the Mammalian gallery, where you can see it. We are all indebted to Sir Harry, not only for his work, but for the wonderful collections he made during his Commissionership in Nyasa Land, and last of all for the very excellent collection he has made during his stay in Uganda,

---

* Mr. Moore must have misunderstood me. Perhaps almost more than any other traveller in these regions, I have insisted on Ruwenzori being a snowy range, and not a single snow-peak. More than a year ago I styled it the Caucasus of Central Africa. At the same time we must not exaggerate the length from north to south of the succession of snow-peaks and glaciers; this can scarcely exceed 30 miles. With the amount of snow and the extent of glaciation in this equatorial region, the maximum of 16,000 feet, suggested for the extreme altitude, is impossibly inadequate. Judging by eye alone (and I have seen the Alps and Himalaya), I should give a minimum of 20,000 feet for the highest point.—H. H. J.

which has been the more difficult as he has been travelling about, and that always makes it rather difficult to collect animals of any kind. But he has done what very few travellers do—he has collected a number of large birds, such as Vultures, Storks, and Eagles, such as we seldom get from the interior. So we have to congratulate him, not only on the work he has done in the past, but on the success of his present expedition.

The PRESIDENT: I feel sure that the meeting will agree with me that it will be very difficult to express our thanks adequately for the most instructive and interesting evening Sir Harry Johnston has given us, and for the series of pictures and his admirable commentaries upon them. I now propose a very cordial vote of thanks to Sir Harry Johnston, which I am sure will be carried unanimously.

APPENDIX I.

LIST OF PLANTS COLLECTED BY SIR HARRY JOHNSTON'S EXPEDITION ON RUWENZORI RANGE, 4500 TO 13,000 FEET.

Ranunculus pubescens, Thunb.
Nymphæa stellata, Willd.
Cardamine patensis, L.
Arabis alpina, L.
Polygala near Fischeri, Gürke.
Hypericum lanceolatum, Lam.
Symphonia sp.
Hibiscus Grantii, Mast.
„ ?
Grewia mollis, Juss.
„ populifolia, Vahl, forma (G. membranacea, A. Rich.).
Geranium aculeolatum, Camb.
Impatiens Ehlersii, Schweinf.
Cardiospermum microcarpum, H.B. and K.
Bersama, cf. abyssinica, Fres. Flowers only.
Dolichos shuterioides, Baker.
Milletia sp.
Æschynomene sp.
Tephrosia dichroocarpa, Stend.
Parochetus communis, Ham.
Cynometra, probably new species.
Alchemilla, near A. argyrophylla, Oliv.
Rubus sp.
Kalanchoe, cf. glaucescens, Britten.
Combretum racemosum, P. Beauv.
Begonia sp.
Anthriscus, sp. nov. = Kilimanjaro, Johnston, 40.
Oldenlandia abyssinica, Hiern.
Pentas Ainsworthii, Scott-Elliot.
„ occidentalis, Benth. and Hook. f.
Visecta, cf. multiflora, Sm.
Mussænda erythrophylla, Schum. and Thonn.
Pentas, near verticillata, K. Schum.
Vernonia hymenolepis, A. Rich.
„ cf. Melleri, Oliv. and Hiern.
Gerbera Lasiopus, Baker.
Coreopsis Steppia, Steetz.
Helichrysum elegantissimum, Dl.
„ sp. Flowers only.
Senecio sp., near S. Johnstoni, Oliv.
„ sp.
Echinops, cf. giganteus, A. Rich.
Lobelia Giberroa, Hemsl.
„ Deckenii, Hemsl.
„ Stuhlmanni, Schweinf.
Erica arborea, L.?
Philippia, sp.
Asclepias macrantha, Hochst.
Belmontia grandis, E. Meyer.
Cynoglossum cœruleum, Hochst.
Solanum, sp. nov.
Hypoestes triflora, Roem. and Schultes.
Justicia pinguior, C. B. Clarke.
Streptocarpus caulescens, Vatke.
Lantana salviifolia, Jacq., var. ternifolia, Baker.
Premna sp.
Clerodendron myricoides, R. Br.
Celosia sp.

Fleurya æstuans, Gaud.
Synadenium sp.
Arthrosolen latifolius, Oliv.
Podocarpus sp.
Encephalartos sp. Leaflets only.
Eulophia sp.
„ milanjiana, Rendle.
Polystachya sp.
Angræcum sp.
Disa Stairsii, Kränzl.
Gladiolus quartinianus, A. Rich.
Asparagus africanus, Lam.
Chlorophytum blepharophyllum, Schweinf.
Scilla sp.
Gloriosa virescens, Lindl.
Bulbostylis trichobasis, var. uniseriata, C. B. Clarke.
Pycreus rehmannianus, C. B. Clarke?
Carex runssorensis, K. Schum.
Poa sp.
Imperata arundinacea, Cyr.
Olyra latifolia, L.
Davallia elegans, Sw.
Cheilanthes farinosa, Kaulf.
Pteris flabellata, Thunb.
Asplenium furcatum, Lam.
„ amœnum, C. H. Wright, sp. nov.
Asplenium rutæfolium, Mett.
Polypodium rigescens, Bory.
Lycopodium dacrydioides, Baker.
Breutelia Stuhlmannii, Broth.
Polytrichum sp. (barren).
Rhacocarpus Humboldtii (Spreng.).
Herberta juniperina, Spruce (Sendtnera juniperina, Nees).
Plagiochila sp. (barren).

APPENDIX II.

Notes on the Geology and Mineralogy of the Uganda Protectorate.

COLLECTION OF MINERAL SPECIMENS FROM UGANDA,

Made by Sir Harry Johnston, Messrs. George Wilson, Racey, Wm. Grant, C. W. Hobley, F. W. Isaac, and others.

The rock specimens include examples of the Archæan gneisses, schists, and granites, which constitute the main mass of the Uganda plateau: specimens of these rocks come from the Busoga, Bukedi, Elgon, and Unyoro districts, from Ruwenzori and the Nile province. Besides these basement rocks, there are specimens of ferruginous, schistose, and slaty rocks from Unyoro, possibly belonging to the Palæozoic Karagwe series; coarse ferruginous sandstones and quartzites from the shores of Lake Victoria Nyanza and Lake Naivasha, and from Ankole; and volcanic rocks (chiefly phonolites) from Kavirondo, Mount Elgon, Baringo district, Kamásia hills, Lake Nakuro, and the Nandi district.

Of minerals of economic value, the collection contains specimens of iron ore, graphite, and diatomaceous earth. The iron ore includes specimens of magnetite from Budolo hill, Masawa; Nagarive hill, Bukedi; and Jinja, Busoga: and of ironstone (limonite chiefly) from the Central province (Bukonge and Jinja, Busoga), Bugaya islands, Buvuma, Kavirondo, Ankole, and Unyoro. Graphite is present in small amount on specimens from Unyoro (Chief Byabaswezi), and the diatomaceous earth occurs 8 miles west of the Katonga river, and also on the shore of Lake Nakuro. As to the occurrence of gold, all that can be said is that no visible gold could be found upon any of the numerous specimens of quartz in the collection.

List of Specimens.

CENTRAL PROVINCE (BUSOGA AND BUKEDI).

Locality.	Name.
1. Budolo hill, Masawa.	Magnetite.
2. Bukedi country.	Decomposed mica schist.
3. Namjumbas, shore of Vict. Nyanza, Busoga	Grit.
4. Jinja, Busoga.	Hornblende-schist.
5. „ „	Mica-schist.
6. Nampirika Busoga.	Hornblende-schist.
7. „ „	„ „
8. Jinja Busoga.	Quartz.
9, 10. Bukonge, Lake Vict. Nyanza, Busoga.	Ironstone.
11. „ „ „ „	Quartzite.
12. „ „ „ „	Ferruginous sandstone.
13. „ „ „ „	Quartz.
14. Iganga, Busoga.	Quartz.
15. „ „	Pegmatite.
16. „ „	Epidosite.
17. Bugwen, „	Quartzite.
18. Kibui Busoga, shore of Lake Vict. Nyanza.	Diabase.
19. Iganga „	Gneiss.
20. Bukonge „	Ironstone.
21.	
22.	
23. Jinja, Busoga.	Laterite?
24. „ „	
25. „ „	Slate.
26. „ „	Hornblende-schist (decomposed).
27. „ „	Ironstone.
28. „ „	Epidiorite.
29. „ „	Decomposed hornblende-schist.
30. „ „	„ „ „
31. Jinja, Busoga.	Ironstone.
32. „ „	„
33. Nakalanga.	Quartz.
34. „	„
35–37. „	Sandstone.
38. Budolo hill (see No. 1), Bukedi.	Magnetite.
39. Lubusa hill, Bukedi.	„
40. Amuganda hill, „	Quartz.
41. Nabutitisi hill, „	Mica schist.
42. „	Gneiss.
43. Mamjefe hill, „	Decomposed rock.
44. Namanswa hill, „	„ „
45. Asitosiro hill, „	Granite.
46. Madegi hill, „	Decomposed rock.
47. Sunurwa hill, „	„ „
48. Natere hill, „	„ „
49. Makakala hill, „	Quartz.
50. Wadubi „	Decomposed rock.
51. Bugagi hill, „	Large felspar crystal.

	Locality.	Name.
52.	Nagabu hill, Bukedi.	Decomposed rock.
53.	Kumaga hill, ,,	,, ,,
54.	Bukyan ,,	,, ,,
55.	Nagarive hill, ,,	Magnetite.
56.	Magmiti hill, ,,	Decomposed rock.
57.	Nelubi hill, ,,	,, ,,
58.	Kumaga, Nasika ,,	Pegmatite.
59.	Masige hill, ,,	Decomposed rock.
60.	Musara hill, ,,	,, ,,
63.	Kyabala, ,,	Pegmatite.
64.	,,	Granite.
65.	River Ntowolo ,,	,,
66.	Kuzaki hill, ,,	
66.	Mulawa hill, ,,	Quartzite.
67.	,,	Pegmatite.
68.	,,	Gneiss.
69.	,,	Decomposed rock.
70.	,,	,, ,,
71.	Kadudamu hill, ,,	Gneiss.
72.	,,	Schist.
73.	Kamurujo hill, ,,	Gneiss.
74.	Nabare hill, ,,	Gneiss.
75.	Kakani hill, ,,	Granite.
76.	,,	Tuff.
	Jinja, Busoga.	Magnetite.
	Lubas ,,	Quartz with mica.
	Buconge, near Lubas, Busoga.	Ferruginous schist.
	Callanga, Busoga.	,, ,,

LAKE VICTORIA NYANZA.

Bugaya islands.	Quartz, ironstone, ferruginous sandstone, quartzite, claystone.
Near Kisubi (Entebbe peninsula).	Ferruginous sandstone.
Small island near Bagai, Buvuma.	Phyllite.
Main island, Bavuma.	Quartz with mica.
,, ,,	Red ferruginous schist.
Entebbe.	Quartz.
Kampala.	,,
Entebbe.	Clay.
,,	Clay with muscovite.
Near Kisubi.	Ferruginous sandstone and quartzite.
Buvuma, Marabio island.	Ferruginous schist.
Bay between Sango and Kisubi.	,, ,,
Between Kisubi and Kampala.	Sandstone.
Sango.	,,
Tagana.	Quartzite.
Eight miles west of Katonga river.	Diatomaceous earth.

KAVIRONDO.

Locality.	Name.
Bed of Nyando river.	Nephelinite.
Bed of lower Kidonia river.	,,
Upper waters of ,,	,,
Southern slopes of Tindaret, Mount Kamililo country.	Phonolite.
Mount Manava, 12 miles west of Fort Ternan.	,,
1. Awichina, 8 miles north of Kisumu.	Granite.
2. ,, ,, ,,	,,
3. Korando hills, 4½ miles ,,	Phonolite.
4. ,, 2 miles ,,	,,
5. Kisumu, raised beach 1 mile from shore of Lake Victoria Nyanza.	Pisolitic ironstone.
6. Nyando valley, 10 miles west of Fort Ternan.	Limestone from concretionary blocks in alluvial deposits overlying granite and gneiss.
7. Nyando valley, 3 miles south of Kitotoo.	Limestone like No. 6.
8. Lake-shore, south of Port Victoria.	Decomposed schist.
9. ,, ,, ,,	,, ,,
10. Kisumu, three-quarters of a mile from lake.	Phonolite.
11. Mkindu river, Nyando valley, near cart-road from Kisumu to Fort Ternan.	Gneiss.
12. Kiblules or Stormy river, 10 miles west of Fort Ternan.	,,
13. Upper Nyando valley, 1½ mile north of Mount Blackett.	Tuff.
14. Langors camp, 3 miles west of Mau summit.	Phonolitic trachyte.

ELGON DISTRICT.

2. Mumia's, sub-district.	Basalt.
3. Nyifa ,,	Quartz.
4. ,, ,,	,,
5. Tindi ,,	Gneiss.
6. Tindi ,,	,,
7. Kabras ,,	,,
8. ,, ,,	Quartz.
9. ,, ,,	Diabase.
10. Marama ,,	Gneiss.
11. ,, ,,	Quartz.
12. Nzoia river ,,	,,
13. ,, ,,	,,
15. ,, ,,	Gneiss.
17. Lusimo river, ,,	
18. ,, ,,	Decomposed granite rock.
19. Ketosh ,,	Quartz.
20. ,, ,,	Gneiss.
21. ,, ,,	Basalt? weathered.
22. Kahamega ,,	Gneiss.
24. Kibelelwa ,,	Quartz.
25. ,, ,,	,,

Locality.	Name.
26. Mumia's, sub-district.	Quartz.
30. Nyala ,,	Gneiss.
31. Sio river, ,,	Gneiss?
32. ,, ,,	Quartz.
33. ,, ,,	Gneiss.
35. Lego ,,	,,
36. ,, ,,	Quartz.
37. Samia hills.	Gneiss.
38. ,,	Granite.
39. ,,	Quartz.
40. ,,	,,

Mount Elgon.

7000 feet.	Augite crystals.
,,	Nephelinite?
,,	,,
,,	Decomposed rock.
6000 feet.	Fossil wood.
8000 feet.	Augite in volcanic bomb?
,,	Basalt?

ANKOLE.

20.	Quartz, ironstone.
21.	Quartz.
22.	Granite.
23.	Quartz with tourmaline.
24.	Coarse sandstone.
26.	Oolitic ironstone.
27.	Quartz.
1 mile south-west of Kisasagap.	Ferruginous shale.

TORO.

25.	Mica-schist, hornblende-schist, and diorite?

MAU DISTRICT AND NANDI DISTRICT.

Cliffs on north-west coast of Lake Nakuro.	Kenyte.
Hill facing Lake Nakura, south of railway station.	Tuff.
Hill north of railway station, Lake Nakuro.	Glassy lava (Kenyte).
Hill north-east and 5 miles from Lake Nakuro.	Scoria.
Shore of Lake Nakuro.	Diatomaceous earth.
Seget valley, Nandi district.	Phonolite.
Sigowet Hills, ,,	,,
,, ,,	,,
Bed of Seget river, Nandi district.	,,
Kamasia hills, below ravine.	Red jasper, quartz, chalcedon, calcite, and phonolite.
Baringo district, Eldoma ravine.	Basalt, scoria, and phonolite.
Lake Naivasha.	Obsidian tuff, sandstone.

UNYORO.

Chief Tibansamba.

Locality.	Name.
1, 2.	Ferruginous schist or phyllite.
3.	Limonite.
4–6.	Ferruginous schist.
7.	Decomposed rock.

Chief Mutwa.

8.	Gneiss?
9.	Felsite?
10.	Mica-schist.
11.	Gneiss?
12.	Dolerite?
13.	Gneiss.
14.	Pyroxene-granulite.
15.	Quartz.

Chief Byabaswezi.

16.	Junction of decomposed basalt? with schist.
17.	Quartzite.
18.	Quartz.
19.	,,
20.	Schist.
21.	Decomposed rock.
22.	Arkose?
23.	Ferruginous schist.
24.	Lydite.
25.	Claystone.
26.	Quartzite.
27.	Ferruginous schist.
28.	,, ,,
29.	,, ,,
30.	,, ,,
31.	,, ,,

Chief Kiza.

32.	Schist.
33.	Arkose.
34.	Ferruginous schist.
35.	,, ,,
36.	,, ,,
37.	,, ,,

Chief Byabaswezi.

38.	Quartz with graphite.
39.	Ferruginous-quartz-schist.

Chief Tibansamba.

40.	Decomposed gneiss.
41.	Ferruginous schist.

Chief Basigala.

Locality.	Name.
42.	Limonite.
43–46.	Ferruginous schist.

Chief Katalikao.

47–50.	Limonite.

Chief Byabaswezi.

51.	Graphite in decomposed gneiss?
52.	Ferruginous breccia.
53.	Quartz.
54.	Ferruginous schist.

Bari, Nile Province.

Mount Belinian.	Gneiss.
Jibalokaju, north-west of Rejaf, left bank of Nile.	,,
Mount Lado, left bank of Nile.	,,
Twelve miles north of Bedden, right bank of Nile.	,,
Near Bedden.	,, and basalt.

SPECIMENS OF MINERALS AND ROCKS FROM RUWENZORI AND VICINITY, COLLECTED BY SIR HARRY JOHNSTON AND MR. R. RACEY.

List prepared by the Mineralogical Department, Natural History Museum.

Specimens from Ruwenzori and Ankole.

1 (237). Tourmaline and quartz from Charienzi.
2 (236). Iron wire made from ore found at Kahiro.
3 (235). Impure kaolin (mainly quartz) from Mbarara.
4. Quartz from Ruhihi Sema.
5. ,, ,, Mbiumbi, Egara.
6. ,, with mica from Kisenyi, Egara.
7. ,, from Chamianga, Ruzumburu.
8. ,, ,, Niamizi, Ruzumburu.
9. ,, with oxide of iron from Ngoma, Luchika.
10. Clay (decomposed schist) ,, 15 miles north-east of Mount Mfumbiro, Luchika.
11. Basalt, scoria, clay, quartz and ferruginous sandstone from mountain between Lake Chagasa and Mount Mfumbiro.
12. Quartz with mica from north end of Lake Kikombe.
13. Quartz with mica, quartz with oxide of iron, quartz grit with mica from 1° S., 29° 51′ E.
14. Tuff? from Kichwamba, Bunyaraguru.
15. Quartz with oxide of iron, decomposed mica-schist? from north of Kisara, in Bunyaraguru forest.
16. Quartz, quartzite, mica schist from Egara hills.
17. Hæmatite-schist, oxide of iron from Ebari.
18. Quartzite, ferruginous sandstone with mica from Nyakabingo, Bukanga.

SPECIMENS FROM RUWENZORI, ETC.

No.
224–234. from Kuti?
238–245. „ Ruwenzori.

224. Fibrolite.
225. Gneiss with chlorite.
226. Gneiss with pegmatite.
227. Gneiss.
228. Granite.
229. Tuff.
231. „
232. Gneiss with chlorite.
233. „ „
234. Gneiss.
235–237 = 3, 2, and 1 of first list.
238. Epidiorite.
239. „
240. Mica schist.
241. „
242. „
243. „
244. Quartz.
245. Epidiorite.

APPENDIX III.

UGANDA PROTECTORATE—ANALYSES OF SAMPLES OF WATER AND SALT FROM KIBERO SPRINGS, UNYORO.

The following report was obtained by the Crown Agents for the Colonies from Messrs. Stanger & Blount, Chemical Laboratory, 2, Broadway, Westminster.

The waters were slightly yellowish in colour, and contained a small amount of black sediment.

UNYORO. MINERAL SPRING No. 1.

	Grains per gallon.
Silica (SiO_2)	3·64
Ferric oxide + alumina ($Fe_2O_3Al_2 + O_3$)	0·70
Lime (CaO)	6·44
Magnesia (MgO)	2·66
Soda (Na_2O)	155·82
Potash (K_2O)	20·23
Carbonic anhydride (CO_2)	0·42
Sulphuric anhydride (SO_3)	10·13
Chlorine	194·46
	394·50
Deduct oxygen equivalent to chlorine	43·82
	350·68
Combined water, organic matter, and loss	20·74
Total solids	371·42

The chief salts probably present are therefore—

	Grains per gallon.		Grains per gallon.
Sodium chloride (NaCl)	294·05	Magnesium sulphate ($MgSO_4$)	2·79
Potassium chloride (KCl)	32·07	Magnesium chloride ($MgCl_2$)	0·99
Calcium sulphate ($CaSO_4$)	15·64	Magnesium carbonate ($MgCO_3$)	0·80

The sample is a highly saline water, from which common salt could be easily prepared by evaporation. It also contains a noteworthy quantity of potassium salts, the recovery of which from the molten liquor might yield a valuable artificial manure.

UNYORO. MINERAL SPRING NO. 2.

	Grains per gallon.
Silica (SiO_2)	1·96
Ferric oxide + alumina ($Fe_2O_3 + Al_2O_3$)	0·56
Lime (CaO)	3·50
Magnesia (MgO)	1·26
Soda (Na_2O)	124·28
Potash (K_2O)	12·46
Carbonic anhydride (CO_2)	7·29
Sulphuric anhydride (SO_3)	7·00
Chlorine	140·42
	298·73
Deduct oxygen equivalent to chlorine	31·64
Total solids	267·09

The chief salts probably present are therefore—

	Grains per gallon.		Grains per gallon.
Sodium chloride (NaCl)	231·40	Magnesium carbonate ($MgCO_3$) ...	2·65
Sodium carbonate (Na_2CO_3) ...	2·82	Potassium carbonate (K_2CO_3) ...	6·22
Calcium carbonate ($CaCO_3$) ...	6·25	Potassium sulphate (KSO_4) ...	15·22

The water is generally similar to sample No. 1, and, like that, might be usefully worked for sodium chloride and potash.

SALT.

	Per cent.
Sodium chloride (NaCl)	87·67
Potassium chloride (KCl)	4·45
Potassium sulphate (K_2SO_4)	2·28
Calcium sulphate ($CaSO_4$)	1·68
Magnesium sulphate ($MgSO_4$)	0·24
Combined water, organic matter, and loss	3·68
	100·00

The sample is a crude grade of common salt, such as might be produced by evaporating water of the character of those analyzed above.

NOTE ON THE MAP OF UGANDA.—This map is based upon the map of Uganda, compiled at the Intelligence Division in 1899 from surveys of Colonel J. R. L. Macdonald, R.E., Major H. H. Austin, R.E., and Lieut. (now Major) R. T. Bright, R.E., corrected as regards the coasts of Victoria Nyanza by the surveys of Commander B. Whitehouse, R.N., with further corrections by Sir H. H. Johnston, Lieut.-Colonel J. Evatt, and Messrs. R. M. McAllister and C. W. Hobley. The Semliki river and Ruwenzori range, together with the boundaries, are taken from sketch-maps supplied by Sir H. H. Johnston. The Ankole district is in great measure from a sketch-map by Mr. R. R. Racey, also furnished by Sir H. H. Johnston; whilst the survey of Mr. M. Fergusson, of Mr. J. E. S. Moore's expedition, has served for the delineation of the northern shore of Albert Edward Nyanza. The new lake and the configuration of the region in the neighbourhood of the Elgeyo escarpment are from a prismatic compass sketch by Mr. F. W. Isaac; whilst the river system between Kavirondo bay and Lake Naivasha is principally from the map of Captain G. H. Gorges, published in the *Geographical Journal* for July, 1900.

CINEMATOGRAPHING THE SEVERN BORE.*

By VAUGHAN CORNISH, D.Sc. (Vict.), F.G.S., F.C.S., F.R.G.S.

At a meeting of this Society last session I showed some photographs recording the *form* of the Severn bore, but I wished to obtain a photographic record of its *motion*. This I have been enabled to do by the assistance of Mr. Charles Urban, managing director of the Warwick Trading Co., Ltd., who very kindly lent me a bioscope camera and the services of an operator for the purpose of cinematographing the bore. The photograph was taken under my direction on September 29, 1901, and was shown at the meeting of this Society on November 25. I believe this is the *first* cinematograph of a tidal bore.†

The cinematograph picture was taken at Stonebench below Gloucester, which is distant 4 miles by road reckoning from the cathedral. The tide was the third after full moon, and was not quite so high as that predicted for September 30, which was one of the four highest predicted tides of the year. After the dry summer the amount of land-water in the river was probably below the average, nevertheless the low-water level was 1½ foot above that given as summer low water in Admiral Beechey's survey made in 1849. The reason, no doubt, is that the spring tides had already begun to fill up the river. The camera was placed upon the left bank, as low down as was consistent with the safety of the instrument, and about 30 feet back from the submerged "Stonebench," so as to show the breaking of the wave where the water suddenly shallows from 6 or 7 to 2½ or 3 feet. A boat was engaged to meet the bore, and was anchored in deeper water at a suitable distance; and to obtain the scale a post near the left bank was measured, its top being found to be 58½ inches above low water.

The bore was heard at 9 a.m., a few seconds before its appearance round the bend of the river, at a distance of 513 yards from the camera. The resurgings from the concave left bank had a fine effect, well reproduced when the film is shown upon the screen The boat rode easily over the unbroken wave in about 10 feet of water. The height of the wave there I estimate at from 3 feet to 3 feet 6 inches,

---

* Read at the Royal Geographical Society, November 25, 1901.

† The limelight hitherto in use at the Society's meetings not being adapted to show the picture advantageously, I was permitted to appeal to the Office of Works for a separate electrical installation with current of adequate power. The request was most kindly and promptly granted, and a permanent installation has been provided by the Electrical Department, which has not only met the requirements of the cinematograph, but will for the future enable the arc light, instead of the less pure and less brilliant limelight, to be employed for the optical lantern in the theatre at Burlington Gardens.

FIG. 1. Bore in the distance.

FIG. 3. Bore and its optical reflexion

and the height at the sides of the river 4 to 5 feet. At the jetty or breakwater, of which one post already referred to was visible beyond the osiers, the bore suddenly sent a sheet of water up to a height of 7 or 8 feet, but, recovering itself in a moment, the wave came on with a front still smooth and unbroken, its inverted image perfectly mirrored by the smooth water ahead of it. Then, on reaching the hidden Stonebench, the wave curled over in a beautiful scroll (shown in Fig. 4). But no stationary photograph can reproduce the effect which is given on the screen as the dark-fronted curling wave rushes out of the picture, which is then immediately flooded with light, the bright clouds instead of muddy banks being now reflected by the smoother waters. The speed of the bore was about 13½ statute miles per hour. The exposure of film was continued after the bore had passed in order to show the after-rush of water, the speed of which was well shown by floating *débris*. A boat happened to come by, one of the occupants of which was gathering in flotsam and jetsam, and the camera was then revolved so as to follow the boat as it passed. Owing to high osiers intercepting the view upstream, it was not practical to cinematograph the bore from behind, as had been intended. High water occurred fifty-six minutes after the passage of the bore, the total rise being 8 feet 6½ inches. The height of the water then above ordnance datum was several feet higher than high water of even a 40-foot tide at Portishead. The current continued to flow up the river for thirty-one minutes after high water.

The tidal bore in nature is not precisely repeated at succeeding tides, and in most rivers is not seen at every tide. The cinematograph representation, on the contrary, can be repeated on the screen as often as required, and with a delay of only one or two minutes while the film is being re-wound. At each repetition the observer can concentrate his attention upon one particular feature. In this way I have seen several things on the picture which escaped my observation on September 29. Measurements can also be made from the film, either in the hand or from its projection on the screen.

I am now engaged upon a systematic investigation of the bore in the Severn, which I propose to extend to some other rivers, and I hope to present a paper upon the subject to this Society in about a year's time.

Description of the Plate.

(*The figures are enlargements from individual pictures upon the cinematograph film.*)

Fig. 1 shows the bore in the distance as a bright band, where immediately before had been the dark image of bank and trees. The 5-feet post is visible on the left, with its reflection below.

Fig. 2 shows the boat rising to the wave. The wave on the right of the boat

cuts into two the reflection of the trees on the right bank. A comparison with Fig. 1 shows at once the turbulence of the water behind the bore. The alternation of wide bright bands with narrow dark bands parallel to the front of the bore, indicates the character and position of the undulations behind it, whilst the confused reflection of light near the left bank indicates resurging therefrom. If the apparent heights of the banks in the two figures be measured, the level of the water will be found to have risen behind the bore.

Fig. 3 shows the wave as yet unbroken, but with steeper front due to its approach to the shoal; the inverted image is plainly visible. Measurement of the post from the picture shows that the water there is 2 feet 5 inches above the level of the river in front of the bore.

Fig. 4 shows the bore rushing over the Stonebench. The mean level of water at the post is 2 feet 11½ inches above low water, but there is a noticeable difference of level at front and back of the post, indicated by a dark shadow on the picture. This shows that the current, which, shortly before the bore arrived, I found to be ebbing seawards at 0·8 mile per hour, is now making in the opposite direction with considerable strength. The boat remains in position, being anchored.

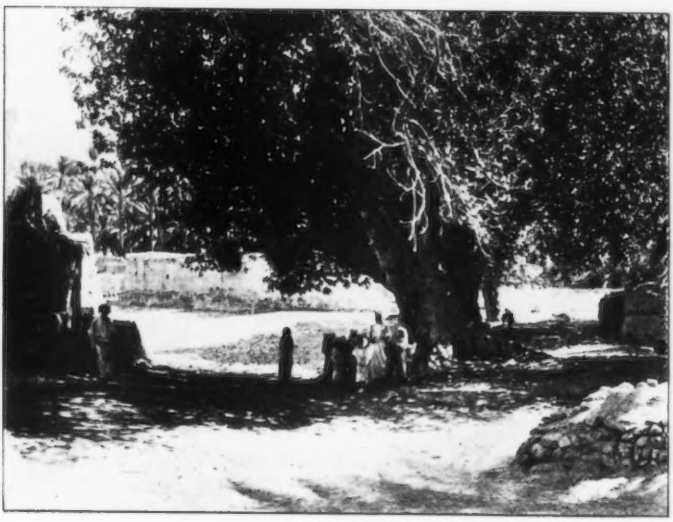
THREE JOURNEYS IN NORTHERN OMAN.

By Rev. S. M. ZWEMER, D.D.

HISTORICALLY, politically, and geographically, Oman has always been the most isolated part of Arabia. As far as outside communication with other Arabs is concerned, Oman was for centuries past an island, with the sea on one side and the desert on the other. The people are even more primitive than Arabs in general. Only Maskat has its eyes open to the wide world; that is the only port in all Oman at which steamers call. Ottoman rule never extended to Oman, not even under Suleiman the Magnificent; nor did any of the earlier caliphs long exercise their authority here. The whole country has for centuries been under independent rulers, called imams or sultans. The population is wholly Arab and Mohammedan, and derived from two different stocks, the Kahtani and the Adnani—rival races ever at feud or war with each other. The Jebel Akhdar region, or southern Oman, has been explored in part by Wellsted, Miles, Carter, and others. Northern Oman and the so-called Pirate coast are less known. It was my privilege, while engaged in missionary labour, to visit this region on three journeys. The first was in May, 1900, when I crossed from Sharka, on the Persian gulf, to Shinas and Sohar, on the Gulf of Oman, by way of Wadi Hitta. Afterwards, in February, 1901, I travelled along the Pirate coast, from Abu Thabi to Sharka; and the last journey, in May, 1901, was right across the north of Oman, from Abu Thabi to Sohar by way of Bereimi. All of these journeys were made with one companion only, a native of Mesopotamia; and we were of necessity compelled to travel with as little baggage as possible, since we knew not how the Wahabi Arabs would receive strangers and Christians. Instead of giving a diary of

each journey, I will combine the results and information gathered on the way into one account.

The only way to reach the Pirate coast is by native boat. On my last journey, we were eleven men in a small boat without cabin and only a narrow sailcloth for awning; a fine Arab horse and a yelping greyhound, presents from the Bahrein sheikh to the Sheikh of Abu Thabi, also took passage. The noble quadruped had the largest share of accommodation midships, and the dog was confined to the forecastle lest prayers be polluted. We had a corner on the left side of the poop; the captain, with a *mullah* and a merchant, squatted at our right; and



UNDER A VILLAGE MANGO TREE IN OMAN.

the crew slept, smoked, washed themselves, and ate their dried fish and rice anywhere.

We passed the islands of Karnein, Arzenah, and Dalma, but did not land. From the latter island I secured some fine specimens of iron-ore crystals and iron oxide. Dalma is a great centre for the pearl-boats during the season, and one of the principal markets in the gulf. Merchants from the Arabian and the Persian coast meet here to secure bargains in pearls, and competition is often very keen.

Abu Thabi is the first town on the so-called Pirate coast, and was settled some hundred years ago by the great Beni Yas tribe. The town is under an independent ruler, Sheikh Zeid, and his influence is wide and strong over all the tribe inland as far as Jebel Akhdar. The sheikh is a well-preserved old man; although his years are over

threescore, he has twelve sons, and the full number of wives that the Moslem law allows. We found him genial, hospitable, and, for an Arab, very intelligent. We were assigned to a large room in one of his stone-built houses, and all our wants were supplied from his beneficence. Huge dishes piled with rice, steeped in gravy, and crowned with several pounds of prime roast mutton, the whole surrounded with dates and bread-loaves on a large mat, and washed down with perfumed water! We were never hungry in Oman; everywhere this hospitality was repeated.

The population of Abu Thabi is not over 10,000, and, except a dozen Banyans from Sind, is wholly Arab or Negro. With the exception of a dozen houses and an imposing castle, the whole town is built of date-mats, and extends along the seashore for nearly 2 miles. The only industries of the town and of all the coast are pearl-fishing and drying fish for export. On Ptolemy's map of Arabia this region is named *Ichthiophagoi;* and Niebuhr wrote, "Fishes are so plentiful on the coast, and so easily caught as to be used not only for feeding cows, asses, and other domestic animals, but even as manure for fields." His testimony is true.

About 80 miles north-east of Abu Thabi is the real metropolis of northern Oman, the growing town of Debai. In the 'Persian Gulf Pilot' (edition 1890) the population of this town is given at 5,000; it is at least three times as large now. Between Abu Thabi and Debai the coast is desert, and so flat that a hill 220 feet high is called Jebel Ali (the high mountain). This is the only landmark on the coast, and visible 17 miles. The town of Debai has many good houses built of native stone, and plastered on the outside; the harbour is an inlet, or *khor*, and the town is built on both sides of this, so that ferry-boats ply between continually, and the place has a business-like aspect quite unusual in Arab towns. At the present rate of growth, Debai will outstrip all the other towns, and soon be a port of call for steamers. At present all the cargo for this region is landed at Linga, and re-shipped in native craft.

Sharka is still a Wahabi centre, although this Moslem sect has lost a great deal of its old fanaticism. The people of Debai, however, consider their neighbours heretics, and make sport of a rival bazaar where tobacco is still sold *secretly*.

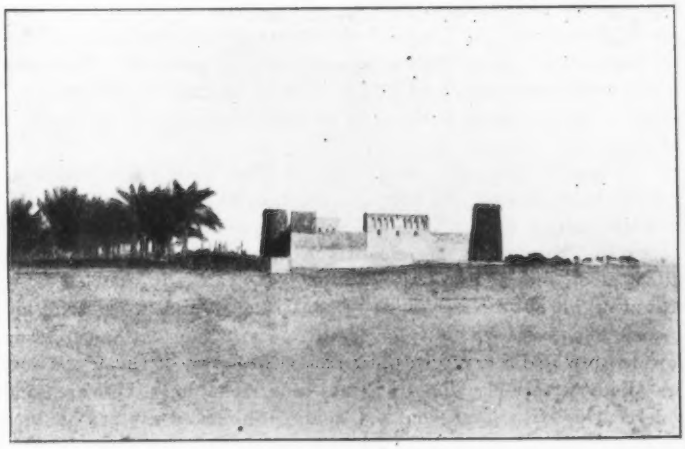
Formerly this entire region was noted for the savage ferocity of its inhabitants. Forty years ago Sir John Malcolm wrote, "Their occupation is piracy, and their delight murder; they are monsters." Thanks to British trade and influence in the Persian gulf, these fanatic Wahabis have become tamed, and they have settled down in many places to begin agriculture. Young date-plantations are a sign of the progress of civilization, and commerce is crowding the nomad spirit out.

From Sharka the coast continues flat and sandy until you reach

Ras-el-Kheima; Ajman and Um-el-Gawein are unimportant hamlets. The low coast which is characteristic of all the Arabian littoral from Kuweit down the gulf, ceases here and gives place to rugged headlands:

"O'er the sea
Of Oman beetling awefully;
A last and solitary link
Of those stupendous chains that reach
From the broad Caspian's ready brink,
Down winding to the green sea-beach."

Jebel el Harim, the chief peak of these headlands, is 4470 feet high, precipitous and rugged, as are most of the peaks on Ruus-el-Jebal.



THE CASTLE AT ABU THABI.

Ras-el-Kheima, the largest of the northern towns, was identified by Bochart and Sprenger as the Raamah of Scripture (Gen. x. 7, Ezek. xxvii. 22), while the Greek geographers speak of it as Regma Polis. There are said to be ancient inscriptions on the rocks in the region back of the harbour, but I did not visit the spot. There is coffee-house babble in Eastern Oman concerning a mysterious race of light-complexioned people who live somewhere in the mountains, shun strangers, and speak a language of their own. I think I have found the clue to this strange story that has puzzled travellers to Maskat. At Khasab, near Ras Musandam, live a tribe whose speech is neither Persian, Arabic, nor Baluchi, but resembles the Himyaritic dialect of the Mahras described by Carter (*Journal Bombay R.A. Soc.*, July, 1847). This language is used by them in talking to each other, although they speak Arabic with strangers. Their complexion is, however, like that of the

average Arab, and their religion Islam. Perhaps this is the tribe the rumours refer to.

In my journey from Sharka across the north of Oman, we rode on camels. For the sum of twenty *rials*, or Maria Theresa dollars (the standard of value among all the nomad Arabs), we secured two companions and five camels to take us to Sohar. By travelling in the cool of the day or by starlight, and resting at noon under some scraggy acacia or in the shade of a Beduin fort, we completed the distance of ninety odd miles in a little over four days. At first the road is bare desert of white sand without pasturage, and therefore without even the booths of the nomads. But on the second day we passed villages and cultivated fields. The three chief hamlets are Felaj, Fulaij, and Athan. On this slope of the Zahira hills there is good pasture and plenty of water. One night we slept in a wadi-bed, surrounded by thousands of sheep and goats, driven in by Beduin lasses from their pastures. The ascent to the wadi-passes that lead to the coast is gradual, the descent more abrupt. As the usual route by Wadi Hom was said to be unsafe, we followed Wadi Hitta.

Our guides proceeded mounted, but with their rifles loaded and cocked; then followed the baggage-camel, to which mine was "towed" in Arab fashion by hitching the bridle of the one to the tail of the other; in like manner, my companion rode his beast fastened to the milch-camel, followed by its *two* colts. We were not troubled by the heat at night, but during the day it was intense, and it was refreshing to come to an oasis where water burst from a big spring, and trees and flowers grew in luxury. In these mountain passes of Oman the roads run almost invariably along the wadi-beds; sometimes these are sandy watercourses with huge boulders, again deep rocky ravines or broad fertile valleys. Vegetation is fairly abundant. Tamerisks, oleanders, euphorbias, and acacias are the most common trees and shrubs. Where the country appears arid and sterile, one is surprised to find a considerable population of shepherds and goatherds. Their dwellings are mere oval shanties constructed of boulders or rocks; the *tent* is rarely seen in Oman, and is rather characteristic of North Arabia than of the south. In the fertile valleys the population always centres in villages, and scarcely ever is a dwelling found at any distance from this common centre. Here often are the fresh-water wells and the watch-tower that protects them in case of war.

Just at the top of the pass of Hitta is the village of Ajeeb, rightly named "wonderful." The view 1000 feet down the mountain and over the fertile stretch of coast called El Batina out to the Indian ocean was grand. We descended to the sea, and the turbulent mountain stream, so cold to our bare feet as we waded it in the early dawn, dwindled to a brook, and at last ebbed away along the beach, a tiny stream of fresh water. These perennial streams are the secret of the

fertile coast all the way from Wadi Hom to Birka, a distance of 160 miles. From Shinas, where Wadi Hitta reaches the sea, we rode along the coast past El Wa (wrongly given as Lawa on some maps) and other smaller villages to Sohar; thence by boat to Maskat.

Our last journey also terminated at Sohar, but we came across country from Abu Thabi by way of Bereimi and Wadi el Jazi. On the way to Oman I visited the island of Keis, on the Persian coast, about 40 miles west of Linga. The population is mostly Arab, and is now confined to three villages, Sefil, Harira, and Mashi. Date-groves abound,

OMAN CHILDREN IN FEAST-DAY DRESS.

and the water-supply is good. Keis is a very ancient settlement, and has ruins to witness to its former importance. When the trade of Ormuz flourished, Keis rivalled its neighbouring city of Siraf.

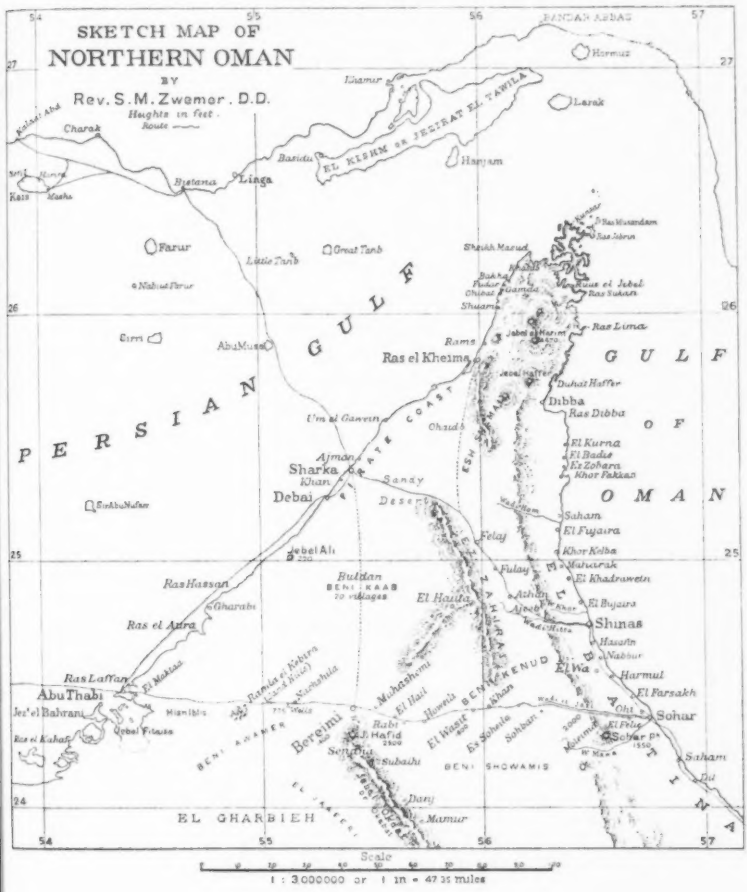
The town of Abu Thabi is situated on an island at high tide, as the backwater of its harbour turns in a few miles beyond the settlement, and forms a channel 200 yards wide, and, even at low water, 5 feet deep. This natural barrier against nomads from the desert has been utilized. Right in the midst of the tidal current stands a fort, built by the predecessors of Sheik Zeid. Even without its challenge, ordinary camels

with their riders have a close escape from drowning every time they cross. Our animals were in up to the breast, and had there been a slip or a stumble we should have come to grief. Along a sand-beach, level as a billiard-table, we rode out from Abu Thabi 10 miles to this ferry, which the Arabs call *El Maktaa*. The water was too high on our arrival, so we slept on the bank until the tide was lower, and the Arab watchman in the fort signalled that crossing was safe. The route we took to Bereimi runs due east for three camel-hours, to a place called Hisn Iblis, the Devil's Castle, an outcrop of limestone rock in fantastic shape above the white sand. For two days beyond, the road is through sandy stretches with scarcely any vegetation. Shale and shingle crop out at intervals, everywhere with a dip of 30° to the north.

We travelled with as little baggage as possible, to avoid awakening cupidity on the part of any Arabs we might meet—only four camels in the caravan, and all our belongings in two Bagdad-leather boxes. At noon we rested under the shade of blankets stretched over our boxes; there was no vegetation large enough for shade. It was over 104° Fahr. in the shade one day, and the water in the skins took on a foreign taste after hours of jerking on the camels. On our halts we made soup from condensed vegetables, and had dates for dessert. But the Beduins of our party were afraid of tinned provisions; they much preferred boiled lizards and rice. There are two species of lizard in Eastern Arabia—one is called *dabb* (*Uromastir acanthinurus*), and feeds only on desert vegetation; the other is called *waral* (*Weranus arenarius*), and eats insects, birds' eggs, etc. The latter kind is considered forbidden, but the former lawful food.

The only settlement we passed on the way to Bereimi was Nachshila, a half-ruined village with a few date-trees. By camel-marches and ordinary caravan rate of 3 miles an hour, it is thirty-three hours from Abu Thabi to Bereimi, and thirty-seven from there to Sohar. Water is scarce on the route, but camel-grass and tamarisk shrubs are plentiful when you pass the Ramlah el Kebira, or "the great sand-heaps." This is a long range of sand-mounds shifting with the desert winds, and about 100 feet in height. Dews fell very heavy at night in May, and it was remarkably cold, so much so that we needed camp-fires at daylight on one occasion. On Sunday, May 5, we arrived at an encampment of the Muzari Arabs, and spent the day with them. Their tents were like those of the northern nomads, but smaller and more wretched. These were the only tents we saw in Oman. We left our Beduin host at nine o'clock that evening, and rode until past midnight in the bright moonlight, always due east. In the early morning we came across a poor nomad lass, who had lost herself in seeking for a strayed camel. Our guide gave her water and dates, and helped her on the way to her tribe, the Beni Awamer. All around was a wide wilderness of

sand, not level, but in weird folds and billows that change with every simoon storm. In one narrow pass, between two high sand-heaps, we heard "the song of the sands." A fairly strong wind swept along the upper layer, and its vibrations gave forth two distinct notes, with volume and tone as sweet as a church-organ. The day was hot and dry.



At noon in the camp our Arabs sprinkled the saddle-ropes of the camels —like Chinese laundrymen are said to sprinkle clothes—by squirting them with their mouth full of water. They said it was the only way to keep them from breaking in this intense dry heat, which cracks everything. On Tuesday we reached the oasis of Bereimi, a 4-mile

stretch of fertile palm-country under the shadow of Jebel Hafid, the first spur of the Okdat range. It seems, after careful inquiry from several Arabs, that the true name, or at least a second name, for this mountain range is Jebel Okabat. The first name signifies "knots," the latter "deep defiles;" both names are appropriate to the rugged outline of the range, as seen from the desert.

Bereimi is the name applied to a group of villages in this oasis, viz. Geemi, El Kantara, Oheli, Ain, Saara, and Matrid. These villages are nestled in one continuous fertile strip of garden—palms, fig-trees, mangoes, mulberry-trees, and pomegranates. On the outskirts of the gardens is a plain, green with grass and shrubs, where sheep and camel-herds tell of Arab wealth. The oasis is due to a half-dozen springs of excellent water from the Okdat range, bubbling up out of the rocks, and led in artificial channels to irrigate as wide a region as possible. Bereimi was formerly called Et-Towam (twins), and the ancient name of the district, the Arabs said, was El Ghabir. The entire region from Jebel Okdat and Jebel Akhdar, north-west to the coast, is called by the Arabs *Ez-Zahira*, in opposition to the eastern coast, which is called *El Batina*, terms which are best translated by "the outer" and "the inner" region. On the road from Bereimi north to Sharka there are twenty hamlets of the Beni Kaab tribe; this, too, is a regular caravan-route. Wellsted did not reach Bereimi, and Palgrave's information is inaccurate, as he wrote from hearsay. Bereimi was for many centuries the most important centre of western Oman. In 1736 the Persians, under Saif-bin Sultan, took the castle of Towam, after utterly defeating the forces of Imam of Maskat in a battle fought near Es-Samini. About the year 1800 (A.H. 1214) the Wahabis entered Oman, and their leader, El Harik, a Nubian slave, took up his residence at Bereimi, and levied tribute for his master, Abd-ul-Aziz.* Although no longer under foreign rule, Bereimi is still a Wahabi centre, but the people are very friendly, and have put off the austere garment of Arab Puritanism, although retaining its ritual in their mosques. The towns of this oasis have no special industries; the gardens are well kept, and all the labour is done by slaves, who form, I think, at least one-half of the population.

Beyond Bereimi, the road along the Jebel Okdat range passes the following villages: Hafid, Senana, El Felai, Dank (or Danj), Jabil, Subaihi, Mamur Abri; Jebel Hafid is two camel-hours (*i.e.* 6 or 7 miles) from Bereimi, and thence to Oki it is four days by caravan. By my pocket aneroid I made the height of Bereimi 1400 feet above sea-level. Jebel Hafid is probably about 2500 feet.

From Bereimi we went due east along the Wadi el Jazi route to Sohar. The villages we passed are marked on the map; there are

* See 'Badger's History of the Imams and Seyyids of Oman' (London, 1871), pp. 230 *seq.*

others at some distance on either side of our path, but I did not get their exact names. It is difficult to understand Arabic gutturals from the mouths of such utterly ignorant Beduins as were our companions. The principal tribes east of Bereimi are the Kenud, Majabil, Showamis, and Beni Haith. These Arabs, as well as those of Bereimi, do not acknowledge the authority of the Sultan of Maskat, but have their own chiefs, and are, alas! nearly always at feud with each other. Every peasant goes armed, and one does not pass even a greybeard riding a diminutive donkey without seeing a rifle, or at least a crooked dagger at his side. Yet, in spite of continual warfare, they cultivate every fertile spot assiduously, and raise all sorts of crops—barley, wheat, sesame, vegetables, and even tobacco. In one village we rested on the wide threshing-floor, where the old-fashioned "threshing instrument with sharp teeth" lay idle. The Oman plough is better than that of Mesopotamia, where they use a crooked stick with a sharp prong to cultivate the loamy soil. In this mountain region the law of the survival of the fittest has given the peasant skill in making a real coulter of iron, fitted to a heavy frame and braced with an upright handle of three bars set at right angles to the frame. The common name for plough is not *miftah*, but *hais*.

It took us exactly twelve hours on camels from Bereimi to Wasit; all the road was level except the last 10 miles, where the ascent of the pass begins. The real entrance to Wadi el Jazi is 6 miles beyond Wasit. All these mountain villages of Oman have great similarity: a cluster of stone-built huts around a larger mosque or sheikh's house, narrow paths between the cultivated terraces, and a background of palms overtopped by fine mango trees. The people are simple, friendly, and hospitable. The veil is absent, and the women enjoy unusual respect and liberty. Nearly all of them belong to the Abadhi sect (also called Biyadhi); this is one of the many Moslem sects that grew on the soil of Persian speculation. They have no special tenets, except that, generally, they are more lax in practice of the ritual and less rigid in conduct toward unbelievers. We were known as Christians, and yet they gave us the village mosque in which to treat the sick, preach, and pass the night!

From Bereimi to Wasit the vegetation of the desert is scarce; the only large shrubs are *mirh* and *ghaf;* in the wadi-bed there were several varieties of wild flowers, but not at all in such profusion as in Yemen. Beyond Wasit, however, the country is more fertile, and continues so all the way to the coast. I have never seen more luxuriant date trees and taller mangoes than at Ohi, just north of Sohar; the gardens were beautiful, and the road was for miles in the shadow of overhanging foliage.

From Wasit to Khan is three hours by camel; from Khan to Ohi fifteen. The latter part of the road is very trying both for beast and

rider; rough rocks, narrow defiles, and slippery boulders make the camel-saddle anything but easy for the traveller. We were quite worn-out when we came to Sohar, and had there been a fair wind, we should have taken our journey by sea to Maskat; but after trying it as far as Saham, we bargained again for camels, and rode the entire distance to Maskat along the Batina, 150 miles. This fertile province has been often visited by travellers, and needs no description by me. It may interest economical travellers to learn that the whole journey overland from Abu Thabi to Sohar and on to Maskat cost me and my companion only Rs.90.

BOLIVIA BY THE RIO DE LA PLATA ROUTE.

By Colonel GEORGE EARL CHURCH.

It seems an absurdity that a country lying on the Atlantic slope of South America should carry on nearly all of its exterior trade by the way of the Pacific ocean, yet such is the case with Bolivia. For three-fourths of a century, she has hoisted her products up the eastern side of the Andes to an immense height, lowered them to sea-level, and sent them to a market by the way of Panama or the Straits of Magellan—the nation meanwhile resting in soporiferous contemplation of the problem of gravitation.

As the result of the wrecking and abandonment of the enterprise which, with ample funds, was engaged in the opening of an Amazon route, by the river Madeira, for Bolivian commerce, the country has found itself despoiled by Chile of its little strip of desert sea-coast, with the ports of Cobija and Mejillones, and has thus become a completely mediterranean state; so that now the unintelligent boundary-lines given to Bolivia by General Bolivar threaten her autonomy more than ever. After the Madeira river route was abandoned, several futile attempts were made to prove that its advantages would be exceeded by connecting the valley of the Mayu-tata by railway with the Aquiry branch of the Purus affluent of the Amazon, an idea which explorations demonstrated to be of no value.

Now, the Government is turning its attention to the Paraguayan side of the country, and has just published, in Buenos Ayres, a work of considerable geographical importance called 'Exploraciones Practicadas en el Alto Paraguay y en la Laguna Gaiba, por el Capitan Enrique Bolland,' an English mercantile officer who, it is stated, has had extensive experience in navigating the rivers of the Plata basin, and who, in the employment of Bolivia, has recently made surveys and founded a port for that country on the Alto Paraguay.

Heretofore the efforts of Bolivia to establish a south-eastern outlet

have been feeble, and have depended principally upon the enterprise of private individuals. True, the reports on the character of the region to be traversed have not been encouraging, and Article II. of the Treaty of Limits of 1867, with Brazil, was so framed that it gave the latter country almost the entire upper Paraguay river from the Bahia Negra, 20° 10′ S. lat., leaving to Bolivia only the western *half* of the lakes Caceres, Mandiore, Gaiba, and Oberaba, which connect with the Paraguay by intricate and shallow channels. These *lagunas*, or lakes, aside from some of the drainage of the Chiquitos sierras, take part of the western overflow of the vast marshes of the Xarayes, which, in the rainy season, flood thousands of square miles, struggling to maintain the lacustrine condition which, in that region, followed the subsidence of the ancient Pampean sea.

Captain Bolland gives us some interesting geographical data in his report. The expedition left Puerto Suarez (lat. 18° 55′ 26″, and long., west of Greenwich, 57° 50′ 31″) on November 9, 1900, on the steamer *General Pando*, especially charted for the explorations. She was 70 feet long, 25 H.P., and drew a minimum of 3 feet of water. It took $3\frac{1}{2}$ hours to reach Curumbá, 11 miles up-stream, owing to the shallowness of the Bay of Caceres, the steamer finding it almost impassable without touching bottom. Two miles above the mouth of the San Lorenzo (or Cuyabá) river, the course of the Paraguay, suddenly changing direction, comes in from the west and leaves to the north some lagunas of little depth. and bays which extend to the front of the great laguna Oberaba. The river here is much narrower, but its depth continues to be the same. Just before reaching the outlet of the Gaiba laguna, they crossed a bar with but 9 feet of water, and then left the Paraguay to enter a branch which connects with the Gaiba. "This place is notable because the continuation of the Alto Paraguay seems to be simply a very narrow canal, half choked with aquatic plants, forming almost a right angle in its change of direction to the north; while, on the contrary, the arm, canal or true river, which opens into the Gaiba, is broad, clear, and runs directly from west to east. Upon some of the loose rocks which cover the shores are seen engravings, true hieroglyphics—the work, no doubt, of the Guatoes, or of ancient dwellers in this region."

"This section of the Alto Paraguay, so called between Curumba and the laguna Gaiba, has for the greater part of its serpentine course the same appearance as the Paraguay between Asuncion and Cúrumbá, sometimes running between low banks, swamps, and inundated areas covered with aquatic and tropical plants, and then again flowing between low hills or at the foot of a cliff, the rocky formation of which is covered with vegetable earth, upon which are generally shady forests. . . . In all this part of the Alto Paraguay, there are but three passes of little depth. The first, going up-stream, is the 'Rio Viejo,' which on November 18 had 9 feet depth of water; the second, 'Las tres Bocas,'

passed the same day, had 11 feet; and the last, that of the Gaiba, on November 20, had 8 feet; this being the least depth, the maximum in general being 50 feet. The section has no very quick bends, nor currents which exceed 3 miles an hour, nor are there aquatic plants which obstruct the channel. In *résumé*, this upper Paraguay river is completely, and at all seasons, navigable for steam-craft drawing up to 5 feet of water, the length of which does not exceed 65 metres (213 feet). It should be stated that these observations were made in November, 1900, and that, due to the configuration of these regions, it is possible, or, better said, probable, that both the channel of the river as well as the formation of its banks may vary. Speaking of low and inundated banks, any flood, be it casual or periodical, can cause the river to change its course and the character of its banks, and consequently of its channels, which is corroborated by the Paraguay and San Lorenzo, the channels of which have completely changed their direction in certain places since several years."

Captain Bolland, after penetrating the Gaiba, went north through the narrow caño or canal, 10 miles long, which he calls the Rio Pando, and which connects the Gaiba with the Oberaba laguna. He describes the canal as having, in general, low margins entirely subject to floods, and offering no solid foothold, except a part on the eastern side, where it runs along the base of some of the hills of Guato covered with loose stones, which slide into the river and form reefs. "The Oberaba is apparently much larger than the Gaiba, but its margins are entirely inundated at high water; and the lands which surround them, as far as the eye can see, are swamps covered with trees and aquatic shrubs, without a hill to the west as in the Gaiba. It was entirely free from *camalotes*, which is not surprising when its great area and the sea raised by any wind are considered, these impeding the formation of floating vegetation upon its low shores. The depth of the Oberaba at its entrance is 6 feet, but this should increase as the centre of the lake is penetrated."

Returning from the Oberaba to the Gaiba, the little steamer grounded in mid-canal, and, at its Gaiba exit, scraped over a *tosca* reef for a distance of 65 feet. The finding of *tosca* at this point confirms the extent inland of the ancient Pampean sea. Some effort was made to pass through an apparently connecting caño between the Gaiba and the Gaiba Merim, a laguna estimated to be about 3 miles long and half a mile wide, and a short distance west of the Gaiba; but the canal was only 2 feet deep, and so choked with plants that it could not be navigated. In entering the Gaiba by the Rio Gaiba from the Paraguay, only 4 feet depth of water was found, but afterwards a careful examination resulted in the discovery of a channel having a minimum of 7 feet.

The Gaiba is, according to the map which accompanies Captain Holland's report, divided into a northern and southern section, the latter

occupying about two-thirds of the entire area of the lake, and being about 5 miles wide from east to west. The map shows the total length of the lake to be about 10 miles.

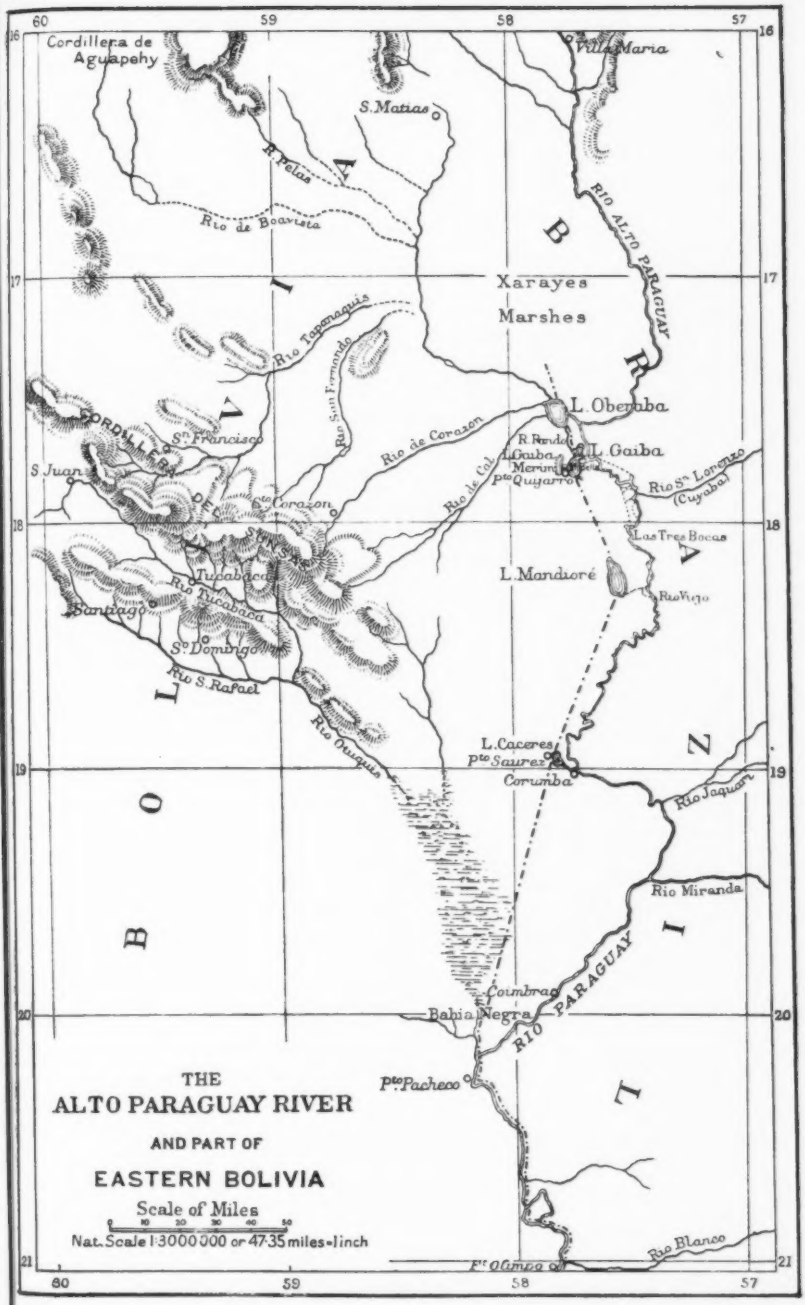
Captain Bolland selected a site for a town and port on the western or Bolivian shore of the southern part of the lake, and gave it the name of "Quijarro," in honour of the Bolivian minister to Paraguay. As the position is the same as that selected in 1543 by Martinez de Irala and named by him "Puerto de los Reyes," it would have been a graceful recognition of the merits of that *conquistador* had the port been called Irala. Captain Bolland says of the Gaiba, "The eye never tires of admiring this vast extension of water entirely surrounded by hills, some very high, covered with thick foliage. . . . Lake Gaiba is divided into two nearly equal parts by an imaginary line fixed by the International Commission of Limits between Bolivia and Brazil, but the northern part of the Gaiba is entirely in Brazil. . . . The maximum depth of the lake is 12 feet when its surface is 10¾ feet below the highest flood-line. This depth decreases as the shores are approached, until on the Bolivian side it is 5 feet deep, about 650 feet from the shore; while on the Brazilian side it is the latter depth at 100 feet from the margin. The Bolivian shore is low throughout, and, with the exception of the 'Bahia Quijarro,' subject to floods, much of it to a considerable distance inland. . . . The shore of Port Quijarro rises gradually for a distance of 75 feet from the water's edge up to 3½ feet above flood-line, and thence, for about two-thirds of a mile, slopes up at the rate of 5 feet per 1000 to the foot of Mount 'Bella,' which is about 300 feet high. All the southern coast is subject to inundations in high floods, and is covered with aquatic plants. A connection probably exists between the Gaiba and Lake Mandiore, but the caño is so choked with vegetation that it is impenetrable. The Gaiba Merim is surrounded by low hills, the nearest being about 1½ mile from the Gaiba. Through these hills must *perforce* be found the route to reach the centre of the Republic of Bolivia." The site of the proposed town is covered with a dense growth of tropical vegetation. The explorations were made in the early part of the rainy season, from November 21 to December 17, 1900. The Gaiba abounds in fish of many kinds, especially the *piraña*, or *palomita*. Among other insects, vast clouds of mosquitoes "constitute a regular plague." The temperature during the explorations was extremely variable, ranging from 21°·50 C. on December 7 to 40°·20 C. on December 12. The latitude of Port Quijarro is 17° 47′ 35″, and the longitude west of Greenwich is 57° 44′ 38″; magnetic variation, 4° 44′ E.; height above the sea, 558 feet; distance by river from Buenos Ayres, 1653 miles.

Among the conclusions drawn by Captain Bolland, "it is necessary to mention the great advantages offered by the Gaiba over other points of the Bolivian territory adjacent to the Alto Paraguay for the

establishment of a direct fluvial route between the European markets and the interior of Bolivia. Ascending the Alto Paraguay, the first point reached is the Bahia Negra, which would require dredging for any navigation before reaching solid ground, which is lower and subject to inundations in extraordinary floods. To communicate with the interior, it is requisite to find a track among overflowed areas, salt marshes, and useless barren lands, and the distance to Santa Cruz de la Sierra is 62 miles longer than that from the Gaiba. The next point up-stream is the Bay of Caceres (Puerto Suarez). Like the Bahia Negra, it is of little depth, and also requires important dredging, and this in Brazilian territory. The road to the interior, the only one existing, or which can exist, is intransitable for carts in one section during the rainy season; and it is in that epoch that the river is the highest, and consequently when vessels can most easily reach Puerto Suarez. From here to Santa Cruz de la Sierra the distance is 23 miles greater than from Gaiba." The next point is Gaiba, "the port of which can be reached without dredging. It is only necessary to establish the most direct communication with Santa Cruz by a road to San Ygnacio, the construction of which would be simple, as the country it would cross is almost level, with slight undulations, and, moreover, is high, dry, and free from floods, with fertile lands of the best class. True it is, the river distance is 280 miles greater than from Bahia Negra, and 140 miles more than from the Bay of Caceres. . . . Goods imported at the latter port have to be transhipped at Cúrumbá into small craft of light draft; thus to reach Puerto Suarez the cost is almost equal to the freight paid from Buenos Ayres to Cúrumbá. The goods for Santa Cruz de la Sierra have to be taken in carts or on mule-back 400 miles, when from the Gaiba the distance over fertile lands would be 379 miles."

"In my judgment, the laguna Gaiba is the only point of Bolivian territory upon the Alto Paraguay where a port can be established without great expense, which will permit the shipping of the valuable products of these rich regions on Bolivian steamboats and take them directly to an Argentine port."

"From Port Suarez to Santa Cruz, some merchants, at times, contract for transportation by mules or pack-saddle oxen, obliging the owners to sign an agreement to deliver the goods in forty days in consideration of a payment of 80 cents extra per *arroba* (25 lbs.). Owners of carts require five months to carry goods between the same points, but only when the road is very good; that is to say, when there have been no heavy rains, inundations, or excessive droughts. The worst feature is the scarcity of carriers, due to the great mortality of animals; and it is no rare sight to see goods remain at Puerto Suarez, six, eight, and even twelve months without finding any one to take them. Some merchants are making the experiments of sending goods by way of Salta and Yacuiba."


Cordillera de Aguapehy
Villa Maria
S. Matias
R. Pelas
Rio de Boavista
BOLIVIA
Rio Alto Paraguay
Xarayes Marshes
Rio Tapenaquis
Rio San Fernando
L. Oberaba
Cordillera de S. Juan
S. Francisco
Rio de Corazon
R. Rendido
L. Gaiba
Merum
pto Quijarro
Rio S. Lorenzo (Cuyaba)
S. Juan
pto Corazon
Las Tres Bocas
L. Mandioré
Rio Negro
Tucabaca
Rio Tucabaca
Santiago
S. Domingo
Rio S. Rafael
Rio Onuqui
L. Caceres
pto Saurez
Corumba
Rio Jaquari
Rio Miranda
PARAGUAY
Coimbra
Bahia Negra
Rio Paraguay
pto Pacheco
Rio Blanco
Ft. Olimpo
THE
ALTO PARAGUAY RIVER
AND PART OF
EASTERN BOLIVIA
Scale of Miles
0 10 20 30 40 50
Nat. Scale 1:3000000 or 47·35 miles=1 inch
60
59
58
57
16
17
18
19
20
21

Such, in substance, is the report of Captain Bolland in his *brochure* of 144 pages (with accompanying maps) giving the results of the expedition; but half of the volume is from the able pen of his Excellency Dr. Antonio Quijarro, the Bolivian minister at Asuncion, who for very many years has vainly been trying to prove that the best trade outlet for his country is by the Paraguay and Plata rivers.

Captain Bolland is entitled to much praise for the new light he has thrown, not only upon an interesting region of South America, but perhaps upon its most important commercial and political problem. It is of such interest that it may not be considered inappropriate to give the experience and views of other explorers in the same field, and a little historical data regarding it.* Alexis Garcia, from Brazil, crossed the Chaco with a large expedition, and raided the frontier of the Inca empire before Pizarro landed in Perú. In 1537 Juan de Ayolas, Governor of Asuncion, undertook to open communications with Perú. He penetrated west from the bank of the river Paraguay at a point in lat. 21° S., which he named Candelaria, where in 1793 the Spaniards built "Fort Bourbon," now Fort Olimpo. He was massacred with his whole following by the Indians of the Gran Chaco. When Alvear Nuñez Cabaza de Vaca succeeded him as adelantado, he commissioned Domingo Martinez de Irala to realize the idea of Ayolas. Irala, therefore, left Asuncion in October, 1542, and on January 6, 1543, reached the laguna of Gaiba, founded the Puerto de los Reyes on its west side, and penetrated four days' march to the west. Cabeza de Vaca himself followed Irala in September, 1543, ascended the Paraguay river to the Gaiba, and entered Chiquitos, a distance of eighteen journeys. He then returned to Asuncion, was forcibly deposed, and was succeeded by Irala. This remarkable man prepared another expedition in 1548, with a view to penetrate Perú. Starting from the Gaiba, he reached the Guapay, or Rio Grande, which he crossed, and marched to the slopes of the Andes near the present site of Santa Cruz de la Sierra. He then sent his second in command, Nuflo de Chaves, with dispatches to the viceroy at Lima. Chaves returned to Asuncion by the way of Chuquisaca, and subsequently, in 1560, made another expedition, and founded the original settlement of Santa Cruz de la Sierra near the existing hamlet of San José. The position of Santa Cruz was afterwards changed to the west of the Rio Grande, at the base of the Andean foothills. It is notable that some of the settlers of the original town, instead of going to the new site when the removal took place, "built a boat, descended the Mamoré and afterwards the Marañon, and finished by reaching Cadiz" (see Azara).

Charlevoix, referring to the Gaiba and the Puerto de los Reyes, says, "Independently of the beauty of the locality and the softness of

* See Herrera, Oviedo y Valdez, Charlevoix, Azara.

the climate, there were many reasons, it appears, to cause the (Spanish) Government to fortify and place a garrison there. Nothing was more appropriate than to establish there a connection between Paraguay and Perú, which it had so much at heart."

Captain Bolland has, no doubt, demonstrated that Irala was right in fixing upon the Gaiba as the most accessible point of Bolivian territory upon the Alto Paraguay, whether from the sea or from the region of the Andes. But navigators of the upper Paraguay in general do not confirm the statement that the Gaiba can always be reached by steamers drawing 5 feet of water. I think, however, that 3 feet may be safely conceded, and this is enough so far as accessibility and commercial utility of the port are concerned. But there is an important factor upon which the report touches very lightly—the character of the country between the Gaiba and the Andean foothills.

Mr. J. B. Minchin, an accomplished engineer, was some years ago employed by the Bolivian Government to explore the northern margin of the Chaco. He says,* "A barren zone, comprising some 20,000 square miles of the northern Chaco, stretches from the Parapiti to the Bahia Negra, and presents an almost uninterrupted extent of low thorny scrub, with great scarcity of water."

It may be said that all attempts to find a practicable route across the Bolivian Chaco from the Paraguay river south of lat. 19° S. have been failures; and, according to the season, the traveller who attempts it may die of thirst or be drowned before he reaches the foothills of the Andes, 400 to 450 miles distant. Some years ago I met, at Santa Cruz de la Sierra, the agent of the Bolivian Consul at Buenos Aires, who had recently arrived, by the way of the Paraguay river, with a consignment of goods. He told me that the steamer was able to reach within only 5 leagues of Asuncion, or as far as Angostura, and then transhipped its freight to a smaller craft for Curumbá. The distance from there to Santa Cruz, 570 miles, he passed over in the rainy season, and found 120 miles of road near Santiago almost intransitable, being flooded and filled with swamps and mudholes. The remainder of the way was better, and supplied with food for man and beast. He thought that the 120 miles of bad road might be avoided by taking a different route. In the dry season, the entire 570 miles is as wanting in water as it is overflowing in the wet one, and oxen and beasts of burden frequently died of thirst in attempting the journey. This information was fully corroborated by the Consul-General of Brazil, who had also just made the same voyage.

Upon the ratification of the treaty of 1867 between Brazil and Bolivia, a demarcation committee was named. Bolivia selected Don Emeterio Villamil, a gentleman of extraordinary scientific and linguistic

* See *Proceedings* of the Royal Geographical Society, July, 1881.

acquirements, who honoured me with his friendship. From Rio de Janeiro, he wrote to his government, November 20, 1869, "Bahia Negra and its vicinity is regularly inundated for eight or nine months of the year; only 6 leagues to the south is to be found high and dry ground. From there throughout the great extent of the laguna of Caceres, the topographical demarcation is absolutely impracticable. In my route from San Rafael to San Matais, I travelled through a part of the low and flooded districts situated to the west of the Mandiore and the Gaiba and Oberaba. Even in the very dry season of July, I passed by swimming, or in hide boats, the rivers Peias, Bugres, and Santa Rita, aside from other minor streams. Said rivers are the discharging arteries or large courses of the inundations which extend to considerable distances on both sides of the river. During the rainy season, the whole of this is the continuation of the lakes Gaiba and Oberaba. They are therefore deserts and inaccessible districts impossible of demarcation by land, and valueless. To the south of Bahia Negra, or to the north, in the Oberaba, even though points might be found suitable for a port, they would be useless on account of the enormous distance, the difficulty to open and maintain roads, and the impossibility of traversing them during the extensive inundations of more than six months of the year."

There appears to be much diversity of opinion among explorers regarding the true condition of the region of the Alto Paraguay during the entire year. Olinden, in 1836, declared that the Otuquis river, which drains into the Bahia Negra from Bolivia, was navigable; and Captain Page, of the U.S. navy, whose extensive surveys of the Plata river system are well known, said he had no doubt of the navigability of the Otuquis. Minchin contradicts these statements, saying, "From its western or Bolivian side the Paraguay does not receive any tributaries of importance north of the Pilcomayo; I found that the river Otuquis, which was supposed to enter it at the Bahia Negra, does not in reality do so, becoming absorbed in lat. 19° 4′, long. 58° 15′, at a distance of some 50 miles from the river, and terminating in a series of swamps which dry up completely every year; indeed, this occurs to a greater or less extent with the other streams which descend from the Aguapehy mountains and the ranges of eastern Chiquitos, the greater part of them becoming absorbed or forming creeks on reaching the lowlands adjoining the river."

Among the Chiquitos sierras are the low ranges of San Juan, the Sunsas, San Lorenzo, Ipeas, and Chochis lying between 17° and 19° S. lat. Some of them overlook the Gran Chaco, and have a south-eastern drainage into the Paraguay. They form a part of the *divortium aquarum* between the Amazon and Plata basins, and are the connecting link between the orographic systems of the eastern and western sides of South America. The northern rain-bearing winds lose most of their burden when they

strike the slope of these sierras, so that when they reach the southern side facing the Chaco they have but little moisture left in comparison to the heavy contribution which they make to the waters of north-eastern Bolivia, which seek an outlet by the falls of the Madeira river. The Chaco lands are therefore very dry, and during the dry season become so baked that their slightly undulating surface offers opportunity for the formation of vast shallow lakes and marshes during the period of rains and floods.

Captain Bolland's report seems to be somewhat indefinite as to the question of inundations to the west of the Gaiba and Gaiba Merim. One may well believe that the whole district requires a more thorough scientific examination than it has thus far received before a sound judgment can be formed as to its natural conditions during the entire year. If the Gaiba can be reached from the west by carts throughout the rainy season as well as the dry one, it may be possible to make a useful commercial route from there to Santa Cruz de la Sierra. Minchin's map shows that the first 60 miles of country is slightly undulating, with forest and grass land. For the following 90 miles a road would skirt the northern base of the Sunsa range, and then strike for 36 miles across sandy pasture-lands covered with scattered brush; then 90 miles through rich pastures, and, in sequence, 60 miles through a dense dry forest, to be followed by the great marshes of the Rio Grande and the difficult crossing of that large, capricious stream included in the remaining section of 43 miles, which, in a total of 379 miles, will take the road from the Gaiba to Santa Cruz de la Sierra, a small town far removed from the active commercial centres of Bolivia. Ultimately the wonderful natural wealth of the heart of South America—Bolivia—must find its way, by the most direct and easiest routes, to the Atlantic ocean, a very large share of it by the Argentine railways, but the greater part by the Amazon river. The opening of the country must, from its geographical situation, be productive of political consequences of the first magnitude to South America.

A JOURNEY FROM FARAFRA TO SIWA, 1898.

By WILFRED JENNINGS-BRAMLY.*

MR. WILFRED JENNINGS-BRAMLY left Cairo on December 1, 1897, with the intention of proceeding to Farafra and Dakhel, and thence to cross the unexplored desert to the oasis of Kufra. Travelling by way of the Fayum, the Birket el Kerun, and the oases of Bahrieh and

* For an account of Mr. Bramly's former journey to Siwa, see *Geographical Journal* x., 1897, p. 597. Map, p. 120.

Farafra, he arrived at the Kasr of Dakhel on December 26. He there expected to meet a man who had been spoken of highly as a guide, but who turned out a complete failure. Neither did he succeed in obtaining definite information on the route he proposed to explore, for the Senusi are very reticent in giving geographical information. Mr. Bramly learnt, however, that the Senusi performed the journey between Dakhel and Kufra in twelve days, and that a Senusi sheikh whom he had met had actually departed by that route, although he had given out that he was going by way of Ain Dal. As this sheikh only took with him a supply of water to last for six days, he supposes that water is found halfway.

Having thus failed in Dakhel, Mr. Bramly returned to Farafra, and left that place on January 10, 1898, with only two camels, his servant, and a very useless guide named Murzuk. He pretended that it was his intention to return to Bahrieh by way of Ain el Wadi, but no sooner was he out of sight of the village than he turned to the north-west, for he really proposed to go in search of Nesla (of Rohlf's map), and thence to a district named Bahrain. He had been told by Murzuk that Dal was the real name of Nesla, and that this small oasis had been discovered by his grandfather when following the spoor of a gazelle which had been snared in a trap set at Elbaida. Some ten years ago Sidi Haled, a sheikh of the Senusi, had offered to buy the place, as conveniently situated on the road from Farafra to Jerubab, when Murzuk made him a free gift of it for "the good of his soul."

On that day Mr. Bramly passed through a cliff-bound gorge to a narrow plateau, beyond which he camped in an open plain. On the 11th he passed to the south of Elbaida (Lebeida), where there is a well of brackish water and camel fodder. This place is frequented by the people of Farafra in search of gazelles.

Before reaching Ain Dal on the 11th, he crossed a belt of dunes having their steep sides towards the north-west. Dal itself occupies a sandy mound. An abundant spring feeds a pool about 4 feet in diameter, and there are clumps of date-palms and much argul (*Alhagi mammiferum*). On a smaller mound about a mile from the spring there is a disused spring. Mr. Bramly discovered the remains of houses built of mud bricks. These ruins he considers to be of Roman origin. At Dal he met two men of Farafra engaged in setting a most ingenious snare for a fox, which they hoped to enjoy for their dinner.

On leaving Dal, Mr. Bramly crossed a country generally level and barren, and bounded to the west by the great Dunes which form the fringe of the Libyan "Sea of Sand." In the evening of the 15th, for the first time since he left Dal, he met with bushes, and was able to pick up some firewood. On the 16th, towards the close of the day, standing upon the brink of an escarpment, he looked down upon mighty dunes, which he likens to a "tremendous sea suddenly turned into

stone." Here and there the sand was pierced by isolated rocks. At the camp he discovered a fossil echinoderm and shells. Earlier in the day he had seen birds, from which he concluded that the district of Bahrain, with its two lakes, must be near.* On the 17th he descended into a broad valley, where a single tamarisk and a few bushes pointed to the proximity of water, and which, after rain has fallen, affords no doubt abundant fodder for camels.

A way up to the plateau was discovered only after a prolonged search. Crossing the plateau, Mr. Bramly, for the first time, met with well-defined wadis, slooping to the north-east. On the 18th he camped in the midst of sand-dunes. On the 19th he crossed the main road from Siwa to Bahrieh, and arrived at a well about 4 miles to the east of Zitun, to which place he proceeded on the following morning, January 20. The principal town of the oasis of Siwa lies about 12 miles further west. Mr. Bramly did not visit it, but started on his return journey on January 21, and reached Cairo by way of Gara Mogara and the Natron valley on February 2.

Mr. Bramly made a careful compass survey of the route from Farafra to Siwa, of which our map is a reduction. The distances up to January 16 were measured by a perambulator, and after that date estimated according to the time spent upon the journey. In following his route we have assumed a variation of the compass of 7° W., and started from Farafra as a fixed point.† Accepting the latitude of Zitun as laid down on the map of Dr. Rohlfs, the resulting over-estimate of the distances would amount to less than three per cent., whilst Siwa, which Rohlfs (or rather his companion Jordan) places in long. 25° 30′ E., would have to be shifted 7′ to the east, or to long. 25° 37′. Mr Bramly determined a number of latitudes, but the results are discordant, and we have preferred to adhere to his traverse survey, which seems to be deserving of confidence.

TOPOGRAPHIC SURVEYING.‡

By Colonel Sir T. H. HOLDICH, K.C.I.E., C.B.

This is a most useful work—one of the first, if not the very first, that deals clearly and comprehensively with all the various branches of the art which we call "topographical" and the Americans "topographic." It is an art which is very much better understood in America than in England. Within the narrow borders of a highly developed country

* In 1896, Mr. Bramly (*Geographical Journal*, vol. x. p. 607) saw "Bahrain with its date-palm forest stretching as far as the eye could reach" to the south of Araj.

† As determined by Mr. H. Beadnall of the Egyptian Survey Department.

‡ 'Topographic Surveying.' By H. M. Wilson, U.S. Geological Survey. Wiley & Sons, New York; Chapman & Hall, London.

like England there is no opportunity for the practice of those wider and, in some sense, looser methods of surveying which are avowedly essential to the mapping of the broad plains and wild stretches of rugged mountain land which form the distinguishing features of America. We must turn to our colonies—to Africa, Ceylon, Australia, and New Zealand—for a condition of land surface which is in any way analogous to that of America. And then we find that, cramped by Ordnance Survey traditions and hampered by the want of trained artists, the topographical aspect of surveying has been generally ignored and lost under the immediate pressure of demands for purely local estate surveys. English colonial surveyors (apart from Canadians) have apparently not yet learned that no amount of compiling and building up of the patchwork of local cadastral mapping will ever produce a topographical whole—that "mother map" (as Wilson calls it) from which all other maps should spring. So we cordially welcome the work of an experienced and highly trained topographical surveyor from across the seas, although we may not altogether agree with the details of the methods he advocates. He writes, of course, as an American for America, and not for India, Africa, or Australia, where, so far as the physical configuration of the land is concerned, we may expect to find as great a variety as exists in America, but where the conditions of labour, of opportunity in the field, and of map reproduction out of it, are all so essentially different that it would be idle to expect American methods to fit squarely in detail to our colonial requirements. In Wilson's book, for the first time, we believe, is exploratory and geographical surveying dealt with as a distinct branch of the general art of topography in supersession of the old "route" and "itinerary" methods. If a fault is to be found with this part of the subject, it is that the subdivision of the various classes of topographic art is based a little too much on the *object* of the survey rather than on the *method* employed. There is no radical distinction of method, for instance, required for the topography of a geographic, geologic, or military map. Wilson extends the geographic branch into scales as large as 1 mile = 1 inch (so long as a sketch-system of hachuring is adopted in lieu of the continuous line contour), which is beyond the limit which would be assigned by Indian surveyors; and thus practically classes it with geologic and military maps, of which this may be considered the standard scale. To all of them the same system of surveying is applicable, and they might all be classed as topographical. But he is right in maintaining that the difference between exploratory (or what *we* should term geographical) and topographical surveys is essential, for this difference involves both method and object. As he insists on a geodetic basis or "control" for the exploratory survey, it is as well to explain that "geodetic control" (in America) signifies any sort of triangulation which involves the use of the theodolite and is

subject to computation. About this part of his subject by no means the last word has been said by Wilson, for there are methods of obtaining the requisite basis or "control" for exploratory work to which no reference is made. The basis of the geographical surveys of America, as of all topography, is the plane-table. This, indeed, is the instrument *par excellence* which, in the hands of a skilled American surveyor, is made to accomplish most for the art of topography. It is even largely used for purposes of triangulation as well as for traversing through forest country, and for contouring the rolling plains. It is in America (as it is in Russia) an instrument which may be termed universal. But not only in the many methods of using the plane-table, but in the art of adjusting those methods to the scale, and in balancing the relations between scale and control (*i.e.* triangulation), have we much to learn from Wilson's suggestive book. The practical application of the "continuous line contour" to the delineation of ground, and the use of the stadia, the spirit-level, and the range-finder as adjuncts to the plane-table, are all useful subjects of study to those surveyors who seriously contemplate the enormous expanse of mapping awaiting them in our colonies, the greater part of which must first of all be tackled on geographical methods, then be partially reduced to exact topography, and finally fall into the hands of the cadastral surveyor. One of the great lessons taught by Wilson is that cadastral surveys come at the *end*, not at the beginning, of those various surveying processes—geodetic, geographic, topographic, and revenue—which all gradually developing and civilized countries in the world have had to undergo.

The illustrations to the work are excellent specimens of the clear and readable nature of American map-printing, which undoubtedly owes much to the colour system of delineation and to the method of line contouring. Where a departure from this recognized method occurs (as, for instance, in Fig. 19, where the vertical system of hachuring has been applied to an exploratory survey) the result is not quite so satisfactory, although the same system represented in Fig. 25 is as effectual as could be desired, and proves that the American topographical artist is a master of his trade. Another commendable feature of the work is the introduction of the tables in context with the explanation of those processes which demand their use. Such tables are usually lumped together in the appendix. Here they come in most usefully in illustration of the text, and are consequently handy for reference. From them we learn (amongst other things) that the cost of American topographical surveys is, on the whole, about the same as that incurred for surveys on similar scales in India, in spite of the extra levelling operations which their system of topographical delineation requires. This is apparently due to economy of labour. But with the larger scales (say 4 inches = 1 mile and upwards) the expenditure increases

in America to three or four times that of Indian surveys. The expenditure in Great Britain over Ordnance Surveys of every class is so largely in excess of that of American or Indian that there must be a want of solid grounds for comparison. This is probably owing to the absolute difference in system: the plane-table is never used in England for Ordnance Survey work. An excellent chapter will be found on photo-topography, which is all the more valuable because it is in America only that the system has had a really fair trial. The author's opinion on this subject is to be found on p. 295: "In the average atmospheric conditions met with in the United States, the topographer will accomplish as much in one day with the plane-table as with the camera, while the resulting map will be decidedly superior;" but under peculiar conditions of cloud and mist, the camera may be useful in procuring a rapid record which would be impossible with the plane-table. American spelling occasionally startles our British conventional ideas throughout the book, and it is hardly consistent. For instance, the common technical word "plot" is sometimes written "plat" and sometimes "plot," and one wonders whether these are two words bearing different meanings, or whether they are one and the same. But this is hyper-criticism when applied to such a work as Wilson's. It is by far the best exposition of the "topographic" art which has yet appeared in the English (or American) language, and, taken in conjunction with Colonel Laussedat's admirable treatise on the history of the same subject, it marks, let us hope, a new era in that history—a clear recognition of the exact nature of the relations which exist between topography and geography.

MAP PROJECTIONS.*

Although only consisting of about forty pages, this little pamphlet contains much valuable information on the subject of Map Projections, as well as many useful and practical suggestions as to their relative merits, and the most suitable projections to be employed under various conditions and circumstances. Major Close has evidently made a thorough study of the subject, and has taken advantage of the mathematical investigations of others, especially the article on Mathematical Geography by Colonel A. R. Clarke, C.B., F.R.S., in the 'Encyclopædia Britannica,' and the 'Traité des Projections des Cartes Géographiques,' by A. Germain. The first of these he very properly describes as "by

* 'A Sketch of the Subject of Map Projections.' By Major C. F. Close, C.M.G., R.E., 1901. London: Printed for H. M. Stationery Office, by Harrison & Sons, St. Martin's Lane

far the most important discussion of the question in English," and continually refers to it.

Notwithstanding the fact that Major Close has drawn largely on previous writers, it would be a great mistake to regard his pamphlet merely as a compilation, for indeed it is far more than this, and contains, in a few pages, much that cannot fail to be extremely useful, both to the practical surveyor and geographical draughtsman. The former will find what he might look for in vain in many more pretentious works—some useful and practical hints on the projections most suitable for plane-table surveying and field work, whilst the latter should profit considerably by what the author has to say about projections in general, A glance at many of our atlases will make it clear to any one who is at all acquainted with map projections, that this subject has not received sufficient attention from those responsible for their reproduction, for although it is, of course, impossible to represent the curved surface of the Earth on a flat plane without distortion of some kind, yet by a judicious selection of the projection to be employed, much can be done to minimize the errors. It is not, however, in atlases alone that a lack of judgment is often displayed in the question of projection, and there are cases where large and important maps have been drawn on most unsuitable projections, such as the well-known French Government map of Africa, on the scale of 1 : 2,000,000, referred to by Major Close. If, instead of the orthographic, a more suitable projection had been employed, such as Colonel Clarke's Minimum Error Perspective projection, there would have been much less distortion in the outer sheets of the map.

After a few preliminary remarks, and a note on Field Projections, Major Close gives a list of the thirty principal projections, which he has arranged under seven different headings according to certain characteristics which they have in common; these are as follows: Orthomorphic, Equal-area, Perspective, Zenithal, Conical, Cylindrical, and Conventional. It is, however, very properly pointed out that "these terms do not strictly represent classes of projections, as they are not all mutually exclusive," but it is a very fair arrangement on the whole, and where necessary, cross references have been made. After this come some very sensible remarks under the heading "Choice of Projections," and a list of the projections used for some important maps. In the second part of the pamphlet the author describes briefly the thirty projections he has selected, in the order in which they appear on the list previously given. The descriptions are extremely short—too short, in fact, in many cases—but nothing more than a sketch of the subject has been attempted. However, it is doubtful if more than two-thirds of the projections mentioned possess sufficient advantages to make them worthy of serious consideration for practical purposes, and if the author had reduced the number, and given the space thus gained

to the fuller treatment of those projections that are really serviceable, he would doubtless have rendered his little book of greater practical value than it is at present. He might then, without increasing the bulk, have given fuller information, and added other useful tables and diagrams.

Much confusion has hitherto existed concerning the names and designation of many projections, and Major Close draws attention to this, and suggests that the matter should be settled by those whose judgment may be considered final and conclusive. He also points out, what is doubtless the case, that a really good and exhaustive text-book on Map Projections in English is much needed, and suggests that one should be prepared, based upon Germain's work and Colonel Clarke's article, to which he refers. There are one or two misprints, but they are so apparent that the reader is not very likely to be misled by them.

REVIEWS.

POLAR.

Dr. Nathorst in Spitsbergen and Greenland.*

In the summer of 1898, Prof. Nathorst organized an expedition in the well-known whaler *Antarctic* to explore the König Karl islands. Favoured by an unusually mild summer, he was able, not only to thoroughly accomplish his principal object, but also to sail round Spitsbergen, keeping a sharp look-out for floats set adrift by Andrée, or other indications of his fate, and to make a number of scientific observations and collections of all kinds.

Many of his most important geographical discoveries have been already described in these pages—the survey of Bear island, as well as its fuller examination by J. G. Andersson in the following year, and the survey of König Karl Land. The chapter on the history of the group appeared in *Ymer*, and a translation was published in the *Geographical Journal*, July—December, 1899. We cannot refrain from making a few remarks on Prof. Nathorst's rejection of the claims of Edge to be the discoverer of these islands. It is hardly necessary to point out that the words in 'Purchas his Pilgrimes,' "as farre to the northwards as seuentie nine degrees," will not bear the interpretation that Prof. Nathorst puts upon them. If, again, this interpretation were correct, and Edge had revised the map, surely the coast-line would have been drawn up to 79° instead of to about 78⅓°. Prof. Nathorst's suggestion that Edge was misled by an optical illusion is rendered doubtful by the fact that a Hull whaler, following Edge, also sighted Wiche's Land and named it Discovery. Still more untenable is the suggestion that Wiche's Land was the east coast of the Storfjord explored by Edge in the previous year, for that Edge himself was the discoverer of Wiche's Land must be evident to every one who reads attentively the whole passage in 'Purchas his Pilgrimes' down to the visit to Bell sound, in spite of the change of person referred to by Sir C. Markham.

---

* 'Två Somrar i Norra Ishafvet.' Af A. G. Nathorst. 2 vols. Stockholm: Beijers Bokförlagsaktiebolag, N.D. Pp. xxxv. + 352 and + xiv. 414. Three maps and numerous illustrations.

The expedition also determined the extent of White island, probably identical with Gillis Land, visited Karl XII.'s island, which proved to be little more than 300 feet high, examined and mapped Van Mijen's and Van Keulen's bays in Bell sound, and demonstrated the non-existence of the Swedish Deep, west of Spitsbergen, besides adding considerably to the scientific knowledge of the archipelago by observations and the collection of plants, animals, fossils, etc., including plankton from depths down to 1150 fathoms.

Several experienced arctic explorers having expressed an opinion that Andrée might have found his way to the north-east coast of Greenland, Prof. Nathorst set sail again in 1899, and, after examining Jan Mayen, steered his course towards Greenland. He made land at Shannon island, and thence sailed southwards till he came to Kaiser Franz Josef fjord, which he explored to its furthest extremity. He found that it became narrower towards the upper end, instead of expanding as shown on the Austrian maps, and that it did not extend as far into the land as there represented. Petermann's peak cannot be more than 9200 feet high. A large channel, opening out of the southern side and extending to Davy's sound, was explored and named Konung Oscar's fjord, while an island formed by branches of the fiord was named after this society. Here also observations and collections were made, and every chapter contains interesting notices on geology, animal-life, ice-phenomena, and other subjects. Prof. Nathorst refers to the past events in the annals of discovery relating to each place he has visited, and compares the experience of other naturalists with his own, thus rendering his descriptions more complete. Incidents of life on board ship and on shore do not occupy too much space, but serve to brighten the narrative. It is a very enjoyable book, and is illustrated by a large number of views, sketch-maps, etc., some of which are beautiful, not only from the grandeur of the scenery they depict, but also as specimens of photography.

CONFERENCE ON THE TEACHING OF GEOGRAPHY.

On Friday, November 22, 1901, a conference was held on the teaching of geography, at the offices of the London School Board, at which many of the teachers under the Board were present and took part. The chairman, the Rev. J. Scott Lidgett, vice-chairman of the School Management Committee, explained that this was one of the series of conferences of teachers organized by the Board.

Dr. Herbertson, of Oxford, began by pointing out that all parts of geography were not equally profitable in education, and that the problem of selecting the most educative was not an easy one. To attempt to do this by drawing up a detailed syllabus to be applied to all parts of the country was worse than useless. The course followed in any school should depend on (1) the geography of the district around it, and (2) on the interests of the teacher. While detailed syllabuses were to be condemned, there was no reason why the principles on which a syllabus should be drawn up should not be outlined. In any course in geography, the principles of the science, the world-distributions, and the home region should all have a place, and, in addition, a detailed knowledge of a selected continent or country. He then emphasized the need of studying world-distributions and the value of classifying the world into natural regions.

Miss J. B. Reynolds, B.A., who recently took the University diploma in geography at Oxford, pointed out that the teacher had to consider what his aims were in teaching geography, and by what methods he could best realize them. The aims

were—(1) to gain information; (2) to develop the mind; (3) patriotic. The first lessons should be geographical object lessons, rather than solely plan and map making. Open-air lessons were especially valuable even in cities, and were not as common as they might be; while better maps, models, and pictures were desirable. The geographer dealt with the ordinary rather than with the exceptional landscape; with the whole rather than with the details. Map-work should include map-reading as well as map-copying. The art of selection was the most valuable a teacher could cultivate. She suggested, (1) the teachers should be given clear ideas of the educational possibilities of geography, and attempt to realize them; (2) a liberal supply of maps, slides, and pictures was essential; (3) school excursions should be organized; (4) examiners should be urged not to lay less stress on knowledge of facts apart from general intelligence; (5) students in training colleges should have an opportunity for studying the best methods of teaching the subject.

Mr. Gee, of Hackney Pupil Teachers' Centre, said that to the definition of geography as a description of the Earth was due the respect of age. When it was considered as the science of the Earth, as the home of man, it raises enthusiasm which no other subject could. Physiography was the basis of geography, which had a natural science and a human aspect which should be co-ordinated. Talks with scholars were more important than lectures; and vivid word-painting and bold maps swiftly drawn were essential in good teaching. Pupils should construct their own definitions. Latitudes were best expressed in sun height, longitude in time units. The geography of the unexpected should be utilized; one of his best lessons was on two locust-beans, surreptitiously nibbled by a boy in class. The teacher should beware of being limited by political conventionalities, *e.g.* the Franco-Belgian region should be taught as a whole.

Mr. Barnes, Haig Street School, warned the teacher against trusting too much to the knowledge he had picked up in working for examinations. The kindergarten should be used for the introduction to geography; object lessons were of great value; railway guides suggested lessons, and great voyages such as that of the *Ophir* or of the *Discovery*. The boys should be encouraged to ask questions. Lantern illustrations were important, but children were apt to look at minor details, and the teacher must be clear what he wished his pupils to observe, and see that they did observe it. He outlined some of the methods of making slides and models, the latter with brown-paper pulp on the ordinary slates. He gave some details of a geographical circle organized by the teachers of the Hackney district. (Particulars of these will be found in the February number of the *Geographical Teacher*.)

Mr. Graham Wallas, chairman of the School Management Committee, said that his committee were desirous of seeing geographical circles formed similar to those at Hackney, and that they would supply slides, models, maps, reference libraries, etc., to such circles. He urged the teachers to apply for the *Geographical Teacher*, which had been put on the requisition list. He also asked schools to apply for permission to arrange for whole-day excursions in spring, and suggested that to different boys and girls different duties might be assigned—the collection of stones, plants, insects, artificial products, the taking of photographs, distance judging, and political geography as illustrated by notices on church doors, etc.

Mr. A. M. Davis, B.SC., suggested Hyde Park as a place for studying river-features, and Primrose Hill for contours. Old Roman roads and other highways might be traced, and parish boundaries, thus combining history and geography.

Mr. Dyke disliked the combination system, and emphasized the importance of the personality of the teacher.

Other speakers pointed out the value of the docks for geography lessons, of letters from friends abroad; while others discussed the question of whether there should be one teacher to give geography lessons to all classes, or to be responsible for other subjects in addition. The necessity of giving geography a more real basis on which true knowledge can be built up was emphasized by one teacher, who said that one moment on a mountain-top was worth ten thousand in the fœtid air of a classroom. Mr. Thorn, who has been studying French schools during the past year, pointed out how composition was taught in the geography class, and that history and geography were taught by one master, who gave more time to the preparation of lessons than our teachers, and emphasized the manners and customs of peoples in his lessons. Mr. G. G. Chisholm, M.A., considered that a committee, including some school teachers, should be nominated by the R.G.S. to draw up a syllabus in geography, brief but elastic enough to be applied to all sorts and conditions of schools. The chairman considered this a valuable suggestion, which he would discuss with his colleagues on the School Management Committee. Votes of thanks were given to the speakers.

THE MONTHLY RECORD.

EUROPE.

Revision of the Ordnance Survey Plan of London.—We have received a communication from Colonel Washington, Director of the Survey Department of the Land Registry Office, pointing out, as likely to be of interest to members of our Society, that during the past three years his department has revised the whole of the $\frac{1}{1056}$ Ordnance Survey plans of the County of London (except the city), very considerable additions having been made in respect of the area newly built over in Hampstead, Fulham, Putney, Tooting, Wandsworth, Streatham, Lewisham, and Plumstead. The large-scale survey has also been extended at Lewisham and near Abbey Wood, and a further extension is in progress near Eltham. This revised work has not been published, but Colonel Washington states that the manuscript plans are available for reference on application.

German Hydrographical Research in the Baltic.—Some account is given in the *Geographische Zeitschrift* (1901, part 10) of a German expedition for marine investigation in the Baltic, which commenced work in August last, under the direction of Fishery-Inspector Heidrich, in the s.s. *Holsatia*, and was well fitted out with instruments for hydrographical and biological work. It was accompanied by six cutters, which were to endeavour to inaugurate a fishery in the open waters of the Baltic. The expedition is regarded as preliminary to the regular work to be started this year in accordance with the resolutions of the Christiania Conference.

The Reclamation of the Zuidersee.—The long-discussed project for the reclamation of the Zuidersee by the construction of a dam across its mouth has during the past year come a step nearer realization through the introduction of a bill into the second chamber of the Dutch States-General, a full account of which, with a *résumé* of the whole history of the project, has lately been given in a foreign office report by Sir H. Howard. The attention devoted to the subject within recent years has been principally due to the labours of the Zuidersee Association, originally formed at the instance of Mr. A. Buma, which resulted in the inception of a practical scheme described in 1893 in the first volume of the *Geographical Journal* (p. 234). The scheme was fully examined by a State Commission, which in 1894

reported to Government that the proposals of the association should, in their opinion, be undertaken with some modifications, and that the work ought to be carried out by the State. The scheme of the Zuidersee Association, as revised and amended by the State Commission, forms the basis of the bill introduced last year by Mr. Lely, minister of "Waterstaat." Its main features agree with those described in the *Journal* in the article alluded to, the most important work being the erection of a great dyke running from the north Holland coast through the Amstoldiep to the island of Wieringen, and from that island to the Friesland coast at Piaam, the result of which will be the formation within the dyke of a fresh-water lake, principally supplied by the waters of the Yssel. Some alteration has, however, been introduced with regard to the subsequent works for the reclamation of portions of the enclosed area. The first area to be dealt with will still be that in the north-west between Wieringen and Medemblik, but the next will not be in the south-east, but in the south-west, between Hoorn and Marken. It is claimed for the scheme, which differs from some of the older ones in including the mouth of the Yssel within the enclosed area, that it will benefit the country, not merely by bringing a large area of new land into cultivation, but also as providing an additional supply of fresh water for the province of Friesland, the surface of which at present receives no other water than that which falls as rain; as promoting the more efficient discharge of surplus water into the sea; and as improving communication both by land and water. The generally lower water-level, as compared with the present, within the Zuidersee will facilitate the discharge of the inland waters, and even when high tides in the open sea prevent the discharge to the latter through the sluices for a few days, the water will not rise to such a height as to cause damage, as is often the case at present. A further advantage is the important reduction of the length of coast to be defended from the sea. The total cost of the work is reckoned at nearly £8,000,000, which it is proposed to raise by loans, to be paid off within sixty years. Of this the great dyke alone will absorb nearly 2½ millions, and will require over eight years for its completion, the entire scheme involving operations extending over eighteen years. This allows for the reclamation of only the two areas mentioned above, but the creation of other "polders" would no doubt follow in time.

ASIA.

Geological History of the Son Valley.—An interesting monograph on the geology of the Son valley, by Mr. R. D. Oldham and two other members of the Geological Survey of India, has been issued as the first part of vol. 31 (1901) of the Memoirs of the Survey. Mr. Oldham contributes the sections dealing with stratigraphy and physical geography, with the latter of which—in great measure, however, dependent on the former—we are more especially concerned here. The most striking physical features of the area under consideration are, firstly, the great Vindhyan scarp, forming its northern boundary, and known further west as the Kaimur range; and, secondly, the great strike-valley of the Son, corresponding almost entirely with the outcrop of the softer rocks of lower Vindhyan age. South of the latter comes a series of more or less parallel but discontinuous ridges, traversed by rivers running northwards across the strike of the rocks of the transition systems which occupy this area. The surface features are directly dependent on the structure of the different areas and on the differential action of denudation on the hard and soft beds of which they are composed; and Mr. Oldham shows that the nature of the ridges varies, as it might be supposed to do from theoretical considerations, with the angle of dip of the component rocks. From various evidences adduced of diversion and concentration of drainage, the conclusion is

drawn that the land has for a long period been exposed to subaërial denudation, and that the present river-channels may be very different from those which existed previous to the last considerable change in the levels. For the elucidation of the past history of the region, the Vindhya scarp, unique in the entire absence of deep-cut cross-valleys, is of great importance. It completely interrupts the general northward trend of the drainage in the Son valley, which is intercepted by the main stream at its very foot. The most important problem to be solved is whether the great east-to-west portion of the Son valley was formed prior to or consequent on the last great uplift; or, in other words, whether there is any trace of drainage channels having crossed the Kaimur range from south to north, at a time when the whole surface was one of low relief, whence hills rose by gentle slopes from broad open valleys. Mr. Oldham shows that on the one hand the absence of important tributaries from the north points to a recent origin of the present valley of the Son, all the streams from that direction giving evidence of recent erosive action; while on the other, the absence of wind-gaps in the Kaimur scarp points to its antiquity. The choice between the two suppositions is facilitated by a consideration of a peculiar feature in the course of the Son, viz. the southerly deviation of the stream near Marai, and its double passage through one of the most prominent ridges of the district. This can only be explained by supposing that the course of the river was already fixed at a time when the form of surface was determined by different conditions to those now prevailing, and has been superimposed on the present surface features. The formation of the valley cannot therefore be ascribed to diversion of drainage during the last great uplift. It must, however, be due to the greater softness of the lower Vindhyan shales, and to diversion and concentration of drainage along this soft band, but these processes must have been at work during long ages prior to the last period of upheaval and active erosion.

Dr. Sven Hedin.—Telegraphic intelligence received on December 19 announced the arrival of Dr. Hedin at Ladak, whence it appears that the traveller has successfully carried out his intention of crossing Tibet to the source region of the Indus (*Journal*, vol. xviii. p. 289).

Return of Lieut. Kozloff.—The St. Petersburg *Novosti* announces the safe return to Kiakhta, on November 30 last, of Lieut. Kozloff's Expedition, thus finally disproving the rumours of disaster circulated last summer.

AFRICA.

The African Society and its Journal.—More than a century has passed since the foundation, under the title of the African Association, of a society whose special aim was the acquisition and diffusion of an improved knowledge of the then mysterious African continent. The first year of the twentieth century has seen the inauguration of another body, whose aims, subject to the altered conditions introduced by a century of exploration and political change, are still practically the same. Founded primarily as a memorial of the late Miss Mary Kingsley, and for the purpose of continuing her work, the African Society has now extended its sphere of operations, and holds as its objects the general furtherance of knowledge of Africa and its peoples, and the legitimate development of its commerce and industries. As a foremost means of attaining these ends, the society has decided to publish a periodical, to be known as the *Journal of the African Society*, of which the first number was issued for October, 1901. It consists of a memoir of Miss Kingsley, by Mrs. J. R. Green; a series of articles on African subjects by various contributors; and a supplement containing a report of the inaugural meeting of the society, and a reprint of the rules, list of members, and so forth. With the objects of the society as above set forth there

can be nothing but sympathy, and if a doubt may make itself felt at all with respect to the new undertaking, it can only arise from a wish to be assured that existing channels are insufficient for the attainment of those objects, and an unwillingness, if such were not the case, to see the already unwieldy mass of periodical literature swelled by an unnecessary addition, however excellent in itself. That a new weapon is needed for the attack of prevailing ignorance on African affairs, is the opinion of the founders of the society, who expressly disclaim the wish to trespass on ground already occupied; and there is no doubt that much good work may be done in the direction of popularizing the study of Africa and its peoples, and bringing before the general public a mass of existing information hitherto known only to experts. Such papers as that by Dr. Wright on German methods of development in Africa, and Colonel Stopford's on West African law and custom, are certainly useful from this point of view. The personal element introduced by the association of the society's work with the memory of Miss Kingsley is, as was pointed out by various speakers at the inaugural meeting, an advantage, as tending to enlist the sympathies of a wide circle. At the same time it carries with it risks which need to be guarded against. A certain tendency is to be observed, on the part of some members of the society and contributors to its *Journal*, firstly, to accept as beyond dispute the opinions advanced by Miss Kingsley; secondly, to ignore the large amount of good work done by former investigators;* and, thirdly, to exaggerate the merits of foreign as compared with British methods, again, no doubt, owing to a too unquestioning faith in Miss Kingsley's views. Such a tendency—for it goes no further—is, after all, a natural outcome of a desire to do honour to one whose powers of mind and nobility of character were alike exceptional.

New Ascent in the Ruwenzori Range.—Since the visit of Sir H. Johnston to the Ruwenzori range as described at the opening meeting of the present session, a further attempt to ascend above the snow-level has been made by Mr. W. H. Wylde, whose journal, kept during the trip, has been kindly sent for our perusal. Leaving Kampala on July 12 last, Mr. Wylde went first to Fort Portal, where he was joined by Mr. Ward, who accompanied him in the attempt on the mountains. Starting thence on August 5—an earthquake shock having been experienced during the previous night—the travellers, like their predecessors, made their way up the Mubuko valley, the real climb beginning on the 8th. After despatching their last solid meal on the morning of this day, they took a few light articles—blankets, great-coats, a small tent, and a small supply of food—and began the ascent with two or three native followers. Mr. Wylde gives a graphic account of the deep gorges, traversed by the foaming river and clad in thick ferny forest, which were passed on that day. Having reached the ridge between the Mubuko and Murumbo valleys, the party made their camp under a huge beetling rock, falling 800 to 900 feet to the Mubuko. In the evening weird sounds were heard, attributed by the natives to a "devil," but possibly due to an owl. The 9th commenced with thunder and rain, the wind blowing chilly. Pushing on through the region of bamboos and heather, up valleys grey with moss and filled with swirling cloud, a level plateau was reached, and, both travellers now feeling ill, camp was formed under a precipice after a seven hours' climb. The scenery still made a weird impression, being, Mr. Wylde says, totally unlike any to which one is accustomed elsewhere. On the 10th, after a sleepless night, a start was made for the snow, much headache

* Archdeacon Sinclair, in an article on the African Association of 1788, ignores the fact that the Royal Geographical Society was the direct successor of the Association, and that it can hardly be said to have neglected the work of African research.

and nausea being experienced. Passing with difficulty through a narrow funnel, the glacier was reached, and a view obtained of the towering summit of Msagamgura (the peak on which the attempt was being made), and of the still huger Kichuchu, snow-capped, with glaciers on the flanks. Behind rose the peak of Kyangi, said by the natives to be higher than the others, and, further still, Ngoma, looking utterly inaccessible. Sending back the natives, the two Europeans climbed, with the aid of entrenching tools, up the glacier and over masses of disintegrated rock, with a precipice below them. After an hour's climb they decided to turn, the peak being still apparently far above them. After another bad night, food having also run short, a start down the mountain was made at 8 a.m., and the former camp reached after nine and a half hours' incessant labour, both travellers suffering severely from their exertions. Mr. Wylde says that he and his companion ascended 500 feet (by aneroid) beyond the spot pointed out to them as that at which Sir H. Johnston turned, the total altitude being 15,000 feet. He estimates the highest peak at 19,000 feet at least, and says that, though a fully equipped traveller might succeed in reaching the summit, this is doubtful, owing to the trying climatic variations and the intense physical discomforts experienced.

Baron Erlanger's Expedition in North-East Africa.—We some time ago recorded the return of Herr Oskar Neumann from his expedition through the Galla countries, begun in company with Baron Erlanger. The latter has since also returned to Germany, having, after separating from his companion, made his way south-east to the mouth of the Jub (*Globus*, vol. 80, p. 325). Baron Erlanger's route was described in the last volume of the *Journal* (p. 214), as far as Ginea, or Ginir, where it struck that of Dr. Donaldson Smith in 1894. Here he got together a new caravan, and pushed south to the Ganale, which was struck below the mouth of the Mane. It was followed down to Dolo, at its junction with the Daua, which latter was ascended a short distance, the caravan then turning south-west to Wak. Baron Erlanger hoped to strike across the unknown southern portion of the Boran country to the south end of Lake Rudolf, but was prevented by the absence of water. Instead, he turned south-east through the Somali country, in which the revolt was then proceeding, and, striking the Jub, followed this to its mouth.

M. Le Roux's Explorations in Southern Abyssinia.—The October number of *La Géographie* contains a fuller account, accompanied by an excellent map, of the journey made early in 1901 in Southern Abyssinia by M. Hugues Le Roux, to which reference was lately made in the *Journal*. M. Le Roux's surveys in the country south of the Blue Nile supplement the work done by Mr. Oscar Crosby to the north of that river (*Journal*, July, 1901), but, as far as its course is concerned, merely confirm the statements and map of the latter traveller, the extreme southern point reached by the river being only just south of 10°. The French traveller's surveys also complete those of Mr. Weld-Blundell's expedition of 1898–99, the routes of the two expeditions practically coinciding for the first half of the way from Addis Abbaba, though further west they separate, M. Le Roux having turned north to the Abai after crossing the Didessa, instead of continuing west to the Dabus. His map is based, as far as the topography is concerned, on plane-table work, for which the nature of the country, with many isolated peaks scattered over the surface, lends itself well. Among other summits, the Tulu (peak) Choki (9760 feet) was climbed, and a round of angles taken, which enabled the features to be sketched in as far east as Gara Limmu, a wall-like escarpment stretching south of the Abai some 80 miles from the point of observation. In the angle between this wall and the course of the Abai the country is said to consist of an undulating plateau, wooded and swampy,

and furrowed by torrents which lose themselves without forming a definite hydrographical system. It contains villages of the Shankalla,* or Beni Shongul, and is bordered on the south by a cold mountainous tract. M. Le Roux visited the junction of the Didessa with the Abai at the most southerly point reached by the latter,† and also that of the Angar with the Didessa, and his map shows that the last-named resembles the Abai in the devious character of its course, flowing in a sharp easterly bend before finally resuming its north-westerly course before its junction with the Abai. At the entrance of the Angar into the Didessa the former is an impetuous mountain torrent, swollen by the waters which descend the Gara Limmu escarpment, and though less copious than the Didessa, turns the latter aside from its course for a short distance owing to the violence of its rush. At the angle between the two streams a hot spring was discovered.

Explorations in Tripoli.—In April and May, 1901, a French traveller, M. de Mathuisieulx, was fortunate enough to have the opportunity of visiting portions of Tripoli which have been traversed by no European since Barth's visit of 1845. An outline of the results was given in the number of *La Géographie* for August last. M. de Mathuisieulx arranged his routes so as to cover the greater part of Tripoli proper, visiting in turn the oasis of Beni Suadi, the Gariana mountains, and the Jebel Iffren, and returning to the coast at Zuara near the Tunisian frontier, whence the route was continued by the shore to Tripoli. A new journey led east along the coast to Lebda, and thence inland to the Msellata hills and the plateau of Tarunha. The traveller describes in turn the zones formed by the coast-line, the plains, and the mountains. With regard to the last, he says that it is a mistake to suppose that their spurs run out to the vicinity of the sea. Such is not the case. Some 6 miles from the base of the chain, the plain begins to ascend gradually until it reaches an altitude of 1000 feet, this sloping ground being covered with poor fields of barley and tamarind trees, while flocks of large-tailed sheep are also seen. The escarpment of the higher ground is steep and furrowed by ravines. Above, the country ill accords with the name of "Little Switzerland" sometimes given to it. It is rather an Arabia Petræa, for the plateau which extends southward some 40 miles at a nearly uniform elevation of 2300 feet is little more than a stony desert, with occasional patches of wild olives, and at one or two spots gardens of figs and pomegranates. Between Gariana and Iffren there is a vast hollow in which remains of Roman tombs were found, while the whole region abounds in subterranean dwellings. The only cultivable tracts in Tripoli proper are—(1) a portion of the coast west of the capital; (2) the Lebda hills; (3) a few valleys in the Gariana and Iffren mountains. The situation shows no prospect of improvement, but rather of growing worse, as the dryness is constantly increasing.

Dr. Weisgerber's Surveys in Morocco.—Dr. Weisgerber, whose explorations in Morocco have already been referred to in the *Journal*, has lately surveyed a route from Casablanca to the Um-er-Rbia, a sketch-map of which, with a description of the country traversed, is given in *La Géographie* for October last. Although the route is fairly well known, the new survey adds somewhat to the topographical details on the map, and rectifies Dr. Weisgerber's former map as regards the position of Settat, which was placed some 5′ too far west. The traveller describes the following zones successively traversed by him: (1) the Sahel,

* This name was applied to these people by the early Jesuit missionaries, and inserted by Ludolf in his map.

† Although the junction of the two streams was not visited by Mr. Blundell, the correct latitude is assigned to it in that traveller's map.

consisting of a series of parallel ridges separated by depressions; (2) the region of the "Tirs," a vast plain covered with rich black soil, rising gradually towards the south; (3) the Mzamza hills, from the midst of which the traveller descends to the valley of Settat; (4) the southern plateau of the Shawia, a rugged upland varying in height from 1450 to 1570 feet: though comparatively fertile in the north, it becomes more and more desolate towards the south; (5) the desert of the Beni-Meskin, stretching south from the Jebel Ftatin to the Um-er-Rbia. The lower course of this stream has, it will be remembered, lately been explored by Dr. Fischer (*Journal*, vol. xviii. p. 91).

Exploration in the Northern Ubangi Basin.—Explorations of two of the northern tributaries of the Ubangi have lately been made by French officials representing the commercial companies to which concessions have been granted by Government in that region. The Kotto, whose basin, as first shown by the Belgian travellers Nilis and Khétulle, extends almost up to the borders of Darfur, has, we learn from the *Bulletin* of the Comité de l'Afrique Française (September, 1901), been examined in its hitherto unknown middle course by M. Superville, who made his way by land to the factory of Hirra, about 200 miles above the mouth of the river, and pushed on to Barang Bakie (probably the ancient Foro),* a little below the confluence of the Ji. Unable to advance further, he sent one of his agents, M. Poisson, to establish a factory on the Bungu, a navigable stream coming from the north-west and 150 yards wide at its junction with the Kotto. The Bungu also was reached by Lieut. Bos, a Government official who had accompanied M. Superville to Barang Bakie. M. Superville himself descended the Kotto in canoes, finding it generally navigable even at low water. Its basin produces large quantities of ivory and rubber, but, apart from the gallery forests along the streams, the country is as arid as the Egyptian Sudan, being covered with grass and thorny scrub. Lieut. Bos is said to have pushed north to the upper Kotto and Dar Banda, executing a survey of hitherto unvisited districts. Further west, the course of the Kuango, which joins the Ubangi almost at its most northerly point, has, according to the *Mouvement Géographique* for October 20 last, been explored by M. Georges Séguin, who reached a point 110 miles beyond Vangèle's furthest, being then, however, stopped by a fall (that of Baidu) in about 5° 50′ N. From this point to the Lumba rapid, at which the *En Avant* was stopped in 1891, the general course of the river is from north to south. Its banks are generally high, and it varies in width from 150 to 200 yards, but is much obstructed by islands, rocks, and sandbanks, which make navigation difficult. The level of the stream varies rapidly according to the weather. A dense population was met with, especially on the right bank, and rubber was everywhere seen, but elephants are absent.

The Congo State Telegraphs: Mr. Mohun's Expedition.—The American consul, Mr. Mohun, who went out by the east coast in 1898 to establish a telegraph line between Tanganyika and the Congo, has, we learn from the *Mouvement Géographique* (1901, No. 45), lately returned to Belgium by way of the Congo, having fulfilled his commission. The Manyema telegraph line extends from New Kasongo on the Congo above Nyangwe to the post of Sungula, a little distance from Tanganyika, and has a total length of 286 miles. New Kasongo has acquired

* The reasons for this identification are not given. Lupton Bey crossed the Engi (which seems to be the Ji of M. Superville) on his way west to Foro, which would therefore be *above* the junction of the Ji with the Kotto. The proper name of the latter is said to be Kuta, and the river may quite possibly be the Kuta of Nachtigal, though hardly that of Lupton.

much importance as a trade centre, and from this point all down the Congo, Mr. Mohun was struck with the flourishing condition of the Belgian ports, and with the safe condition of the country.

M. G. Grandidier in Southern Madagascar.—M. G. Grandidier, son of the veteran explorer of Madagascar, undertook, early in 1901, a new journey in the little-known southern portion of the island, where he had already carried out important explorations two years before. His progress down to August last is recorded in the October number of *La Géographie*. The first journey led from Fort Dauphin, at the south-east corner of the island, to Tulear on the west coast. As far as Tsiombe, on the Manambovo, the country was less dry than had been supposed, and was also unexpectedly well peopled, the population being in places as dense as in Imerina, while much cattle is reared. All the vegetation is either thorny or succulent. Beyond Tsiombe M. Grandidier was guided by the son of the principal Antandroi chief across a plateau on which not a drop of water is found for four days. Reaching the sea at False cape, he followed the coast to Cape Sainte Marie, where a true *terra incognita* commenced. He kept near the coast as far as the mouth of the Menarandra and the little port of Ampalaza, discovered by Houtman during the first Dutch voyage to the east, and then turned north, crossing the upper Ilinta and reaching Tulear at the beginning of August. This whole region forms a vast level plateau covered with thick thorny bush, but fairly peopled. The food of the inhabitants, who light fires by rubbing two sticks together, consists for some months of the year solely of the leaves and fruits of the Barbary fig. The journey was a severe one, and the party suffered from want of water, but the route was thoroughly surveyed. From Tulear, M. Grandidier visited Lake Tsimanampetsotsa, discovered by his father in 1868, mapping the whole neighbourhood. On August 25 he set out for the Mangoka, but intended afterwards to return to Fort Dauphin by a new route.

The Geodetic Survey of South Africa.—The report for 1900 of the astronomer at the Cape of Good Hope includes a summary of the progress made during the year with the geodetic survey of South Africa. Mr. A. Simms, with his assistants Messrs. Heatlie and Antrobus, reached Salisbury on March 31, having spent the rainy season chiefly in experiments at the Cape with Jäderin wires for base-measurement. The angles at fourteen new stations, extending as far as Nyamanje (16° 30′ S., 30° 45′ E.), were measured before the annual grass fires put a stop to observation. The measurements at eleven points already beaconed, and at four or five still to be selected, were left over for completion in 1901. A base-line near Gwibe was measured in November and December, 1901, and the Jäderin wires sent to the Cape for recomparison with the standard bars, the result being to show that all the wires had apparently contracted about one part in 100,000 between August 17 and September 3, 1900, and January 16–23, 1901. Progress was made during the year with the operations of the Anglo-German Boundary Survey, in spite of difficulties of water-supply and transport, a base-line having been measured near Gobabi's in 22° S. Work has been in progress for the re-reduction of the survey made by Captain Bailey in 1859–62 along the south coast of Cape Colony, the original printed report having been full of typographical errors. Operations for the proposed measurement of a great arc of the meridian along the 30th degree will probably be commenced in the south between Natal and the Limpopo, as soon as the country is in a sufficiently settled state. The project has the full support of Sir Alfred Milner, and a resolution of sympathy with the objects of its promoter was passed at the Paris meeting of the International Geodetic Association in September, 1900.

AMERICA.

Surveys in the Hudson Bay Region.—A second report of progress in the exploration of the country between Northern Quebec and James bay was printed last year by order of the Canadian legislature. The work, which extends and completes that carried out by Dr. Robert Bell, as described in the *Journal* for July, 1897, has been executed (1897–99) by Mr. Henry O'Sullivan, Inspector of Surveys for the Province of Quebec, on behalf of the Department of Colonization and Mines in that province. The general nature of the country was so well described by Dr. Bell that Mr. O'Sullivan's report, which gives a detailed description of his various routes in the area lying between Lake St. John, Lake Mistassini, and the south end of James bay, adds little to our knowledge on this score, though making considerable addition to the minute topography of the region. The results of Dr. Bell's surveys are confirmed in a marked degree, few alterations of any importance being introduced into his delineations of the complicated systems of rivers and lakes, with their extremely winding contours. The most important of the new routes lay in the tract to the south of Lake Mistassini, stretching westward to Waswanipi lake, where a good deal of new detail was filled in. Altitudes were taken along all the routes, and a section of the country from Lake St. John to James bay is added to the large map. This contains a large amount of minute work, but the fineness of the drawing makes it difficult to obtain from it a general idea of the hydrographical system. Mr. O'Sullivan adds some remarks on the prospects of the country, and the best means for its development. At present want of communication with the rest of the world causes the resources of the whole region to lie dormant and to be of little value to any one, and Mr. O'Sullivan sees little prospect of a successful opening of a sea-route through Hudson strait. But with the construction of a railway from the south, he thinks they will in time be utilized. The enormous forest wealth is at present that most capable of exploitation, and this by the utilization of the great rivers. The mouth of the Little Nottawai (the Broadback river of Dr. Bell) is said to be the most advantageously situated for extensive pulp industries, a special advantage being the fact that water-power can probably be had on it close to tide-water. It has many large lakes as reservoirs, and its ordinary low-water flow is reckoned at 25,000 cubic feet per second. Mr. O'Sullivan considers that the whale and other fisheries of Hudson bay, and the various indications of minerals throughout the entire region, must sooner or later call for direct railway communication; and he looks forward to the time when Quebec will have its counterpart on James bay, both lying on the track of the shortest trans-continental line of railway. In the last section of the report he discusses the various routes which have been proposed for a railway in the light of his knowledge of the surface features of the country. As a colonization road, he favours a line running from Lake St. John to James bay, but as part of a future trans-continental system, as well as for the development of the lumber industries, a more direct line from Quebec to the bay, leaving the existing Lake St. John line about 77 miles from Quebec, and following the upper valley of the St. Maurice, would be preferable.

The River-system of Connecticut.—A careful and instructive study of the river-system of Connecticut as determined in its main features by the geological structure planes of the country has lately been made by Mr. W. H. Hobbs, of the U.S. Geological Survey, in the twenty-first Annual Report of which department the full results are printed (Part iii., 1901, pp. 1–162). A summary of the most important facts brought out by the study is given by Mr. Hobbs in the *Journal of Geology* (vol. ix. No. 6, 1901). Although the apparent relationship between the

fault-directions of a country and those of the stream-channels has been pointed out by various observers, the writer believes that the only detailed studies which have been made establishing the definite relationship between the two systems are his own in the Pomperaug valley region of Connecticut, and that of Brögger in Southern Norway. The results of both are equally remarkable. In the region studied by Brögger, almost every valley and cleft was found to be formed along a fault-fissure; while the correspondence proved to exist in Connecticut by Mr. Hobbs between drainage lines and structure planes is, as he says, far too close to be accidental. In the Pomperaug valley area the crust is divided, by various intersecting series of parallel, nearly vertical, joints and faults, into a large number of orographic blocks, the smallest of which measure, quite generally, about 50 paces by 100, regularity of spacing of the fault-lines being as marked as their parallelism. The most common directions of the joints and corresponding faults are approximately N. 34° W., N. 55° E., N. 5° W., and N. 15° E. The first two of these are nearly normal to each other, but the larger throws within the region seem generally to have taken place in the directions N. 55° E. and N. 5° W., which give the directions of the sides of the smallest or "unit" blocks, which are equivalent to two rhombic prisms in contact along one side. The various fault-directions are shown to correspond with those of the diagonals of single "unit" blocks, and of associations of these forming composite blocks (*e.g.* three units long and two wide, four long and seven wide, etc.). The whole system of fault-planes may be explained as due to compressive stresses, the resultant of which acted in a direction normal to the axis of Green mountain folding (N. ± 80° W.). The fault-directions can only be traced with precision in the Newark beds of the Pomperaug basin, but it may be concluded that they extend beyond this to the wider area, of which the whole Connecticut valley is but a part, which seems to have been subject to the same general stress. In the Pomperaug valley it was found that the streams, large and small, for considerable distances, adhere with great fidelity to the directions of some of the principal faults, and on extending the study, first to the Shepaug basin and subsequently to still wider areas, up to that roughly coextensive with the state of Connecticut, that the same directions were maintained more or less closely by the watercourses. Maps are given in which the river system has been traced from the U.S. Geological Survey Atlas Sheets, and the principal fault directions above mentioned have been added; the correspondence between the two systems, especially in the case of the direction N. 44° W., being very striking.

Origin of the Name "Cape Nome."—Prof. George Davidson some time ago set himself the task of elucidating the origin of the appellation Cape Nome, which has long been a puzzle to those to whom the question has suggested itself. For a long time he was unsuccessful, but has at last obtained a solution of the problem, which supplies an interesting example of the extraordinary corruptions to which legends in maps may be subject. It is given in the *National Geographic Magazine* for November, 1901. Prof. Davidson traced the name back to the British Admiralty chart of 1853, but no further, it not having appeared in Tebenkof's great Atlas published in 1848–52. It seemed highly probable that the name was given during the cruises of the Franklin rescue ships *Herald* and *Plover* (1845–51), but no published account of their voyages contained anything to throw light on the question. Applying to the present hydrographer of the Admiralty with a view to finding whether the name appeared among the lists of officers of the *Herald* and *Plover*, Prof. Davidson at last obtained the wished-for solution, though not in the way expected. It is supplied by an officer who was on board the *Herald* when the manuscript chart of the Cape Nome region was constructed. On this chart attention was called to the fact that the Cape had no name by the insertion of the

remark "? name" against it. The note of interrogation appears to have been inked in by a draughtsman on the *Herald*, and appeared as "C. Name," but, the *a* being indistinct, was interpreted by the Admiralty draughtsman as Cape Nome, appearing so in the chart of 1853 and in all subsequent maps.

The Costa Rica—Columbia Frontier.—It appears that the award given in September, 1900, by the President of the French Republic in the frontier question between Costa Rica and Columbia has not finally removed the possibility of misunderstanding in the matter. The obvious interpretation of the award gave to Columbia the whole of the Tarire basin, thus thrusting a wedge of Columbian territory far within the normal course of the line as shown on previous maps. This was the view taken in an article by Dr. Seler in *Petermanns Mitteilungen* for December, 1900, and in the accompanying map, both of which were reproduced without question early in 1901 by the Instituto Fisico-Geografico de Costa Rica in its bulletin. Recurring to the question, however, this paper has since questioned the correctness of Prof. Seler's views, showing that the award of the whole Tarire basin to Columbia would be inconsistent with the compromise which formed the basis for the consideration of the case by the arbitrator. In a new map given in the bulletin of the Institute, the line is shown as running southwards across the Tarire basin in order to reach the continental water-parting which afterwards forms the boundary, though it is not clearly shown how this can be squared with the terms of the award. It seems hardly likely that these were incorrectly reported at the time in all the newspapers and periodicals which referred to the matter. Yet in the November number of the *Geographische Zeitschrift*, a note appears in which the line is said to start from the coast at Monkey or Carreta Point, and follow the ridge bounding the Tarire basin on the *south*, not north as originally reported. It may be observed that the Costa Rican map, which is said to embody the results of the latest surveys, shows a second river named Tararia south of the Tarire basin, and it seems possible that a confusion between the two rivers may account for the varying interpretations of the award.

Tides and Sandbanks in the La Plata Estuary.—An attempt to correlate the contours of the ground in the La Plata estuary with the influence of the tidal *régime* has lately been made by the Argentine engineer, J. Figueroa, who has worked out, on behalf of the Ministry of Public Works, the results of surveys on the coasts of the republic. His observations on the La Plata estuary appear in a work entitled 'Estudios sobre puertos de la provincia de Buenos Aires,' an extract from which is given in part vii. of the *Annalen der Hydrographie* for 1901. The outer part of the estuary is obstructed off Montevideo by a group of sandbanks (Archimedes, English, and Rouen banks), between which and the coast on either side are deeper channels, both of which trend towards Montevideo, the more southerly following the curvature of Samborombon bay. The same general features are repeated above Montevideo, the centre of the estuary being again obstructed by the Great and Little Ortiz banks, with deeper water on either side. The western channel is, however, shut off by a continuous bar from the outer deeps. The tidal phenomena to which the formation of the banks is attributed are thus described. The state of the water at different parts of the estuary varies immensely at the same moment, high water occurring so high up as Buenos Aires much earlier than at Cape San Antonio, the southern portal of the estuary, while the ebb actually begins at Montevideo simultaneously with the flood at Cape San Antonio. It is plain from this that the tidal wave which passes Montevideo and makes its influence felt in the inner part of the estuary, is not the same as that which shows itself between Cape San Antonio and the northern end of Samborombon bay. The first or northern wave comes from the east and south-east;

opposite Piedras-Huk it divides into two, one branch ascending the river as a flood-wave, the other making its way as an ebb to Samborombon bay. The second or southern wave runs as a flood-wave north-east past Cape San Antonio, but then joins the outflowing stream, and is carried with it towards the east. In this way Señor Figueror explains (1) the differences in the time of high water; (2) the banks formed east of Piedras Huk, the point at which the two main streams separate; (3) the circular form of Samborombon bay; (4) the outer banks which lie in the centre of the circle described by the currents, and are thus the depositing-ground of the earthy and sandy materials brought by the river and the tide. Against this theory, Herr Herrmann, the writer of the notice in the *Annalen*, quotes the experience of Captain Danielssen, who, during many voyages from the south to Montevideo, has never noticed any great easterly displacement of the water in the estuary, though other captains tell a different tale. He thinks, also, that the tidal phenomena are too irregular, owing to their dependence on changing winds, to justify Señor Figueroa's description of them as permanently applicable.

Examination of the Rio Santa Cruz, Patagonia.—A detailed survey of the Rio Santa Cruz, and of the Lago Argentino, from which it makes its exit, was carried out at the close of 1899 and beginning of 1900, under the orders of the Minister of Marine in the Argentine Republic, by Captain A. R. Iglesias, whose report on the results of his labours has been published officially at Buenos Aires. It forms a valuable addition to our knowledge of Southern Patagonia. The river was ascended in a steam-launch drawing about 3½ feet, accompanied by a six-oared gig towed astern, the mean speed maintained when at full steam being 6 knots. Besides executing a careful topographical survey of the course of the stream, Captain Iglesias carried out scientific observations on the tides, depth, and velocity of the stream, meteorology and magnetism, also collecting information as to the nature of the country on its banks, and the present position as regards its settlement. He was accompanied by Dr. Felipe Silvestri, a naturalist sent by the Ministry of Agriculture, who made collections of birds, fishes, insects, plants, etc., and generally studied the geology, fauna, and flora of the country. The report contains a minute topographical description of the course of the river, illustrated by views, as well as careful instructions for its navigation, for which the employment of a steamer drawing 3½ feet and capable of steaming 10 knots is recommended; the examination having shown that the river may prove of much use as a means of communication. With regard to the prospects of development of the country bordering the river and lake, Captain Iglesias sums up as follows: The lands to the north and south of the river are in general but little fertile, though suitable for sheep-farming, those to the south being capable of supporting the larger number per square league. It is estimated that the area which the establishment of regular navigation would throw open to settlement would support in all some 2,000,000 head of sheep. A considerable extent of land in the vicinity of Lago Argentino presents more favourable conditions, stock of all kinds thriving to a surprising degree, while the land is suitable for agriculture on a large scale, and the forests to the west are capable of exploitation, both for exportation and for home consumption. The foundation of a colony on Lago Argentino is therefore very desirable, and in its interest the construction of a telegraph line from the Puerto de Santa Cruz to the lake is recommended.

AUSTRALASIA AND PACIFIC ISLANDS.

Iron Ores in New South Wales.—A valuable report on the Iron Ore deposits of New South Wales, by Mr. J. B. Jaquet, has lately appeared in the *Memoirs of the Geological Survey of New South Wales* (Geology, No. 2, 1901).

Although, when European navigators first reached the shores of Australia, they found the inhabitants without iron, this was not owing to absence of workable ores, and it is now half a century since the first attempt was made to establish the iron-smelting industry in New South Wales, furnaces having been set going about the middle of last century, near Mittagong, on the southern railway, and at Lithgow, on the western. The quality of the ore and of the iron produced was excellent, and pig-iron was even exported in 1867 to the United States. But the expense of carriage of coal and limestone, and the high price of labour, raised the cost of the product to a prohibitive extent. The question of renewed experiments has been continually before the public of late years, though hitherto without result. Mr. Jaquet has, however, now made a careful survey of all the deposits of iron ore known to exist within a reasonable distance of those centres which, by reason of their proximity to supplies of coal and limestone, may be regarded as suitable for the establishment of smelting works. The result has been unexpectedly favourable, the available supplies of ore being shown to be vastly greater than had been anticipated. The most important deposits are those at Carcoar and Cadia, lying north-west and south-west of Blayney, on the western railway. They are distant from each other only 15 miles, the ore occurring in a belt of Ordovician rocks—clay-slates, argillaceous sandstones, etc., with interstratified lava-flows—which extends between the two places. The importance of these beds lies in their extent, quality, and relative proximity to coal and limestone. Detailed descriptions of these deposits, and of various others which he has examined, are given by Mr. Jaquet in his report, and are illustrated by maps and sections. In a concluding chapter the writer sums up the estimated minimum quantity of ore available at the several localities, and compares it with the quantity of pig-iron represented in the present iron imports of New South Wales and Australasia as a whole, according to the estimate of Mr. Coghlan, the Government statistician. The result is, he considers, to show that there is sufficient iron ore in sight in New South Wales to produce all the iron required by the various colonies of Australasia for many years.

Explorations on the Main Watershed of British New Guinea.—An interesting account of a Government Expedition, lately carried out across the main range of the eastern part of British New Guinea, was given before the Queensland Branch of the Royal Geographical Society of Australia in April last by Sir Francis Winter, chief judicial officer in the possession. The expedition is said to have been in charge of Dr. J. A. Blayney, Captain J. R. Barton, and Mr. A. E. English, but Sir F. Winter seems to have accompanied the party, which set out from Cheshunt bay on September 2, apparently in 1900, but the year is nowhere stated. Its object was to endeavour to secure the arrest of some men of the Puneaburu and Dorevaida tribes, who were implicated in an attack on the village of Merani, near Sandbank bay; and then to travel eastwards to the Keveri valley, which had been reached earlier in the year from Cloudy bay by Dr. Blayney and Mr. English. The main village of Puneaburu, which lies at a height of about 2300 feet on the first high range, was reached from the south on September 9, but was found to be deserted. It was defended by a stockade and three tree-houses. These latter are constructed, Sir F. Winter says, solely for purposes of defence, and the height at which they are placed above the ground is often over-estimated, probably never exceeding some 60 feet. No attempt seems ever to be made to cut down the trees, such a proceeding being stated by the people on one occasion to be quite contrary to native customs. A Dorevaida village was next visited and found to be unenclosed by a stockade, the people apparently trusting to the awe inspired by their prowess. They had, however, deserted their village, though three men of the tribe, as well as three of the Puneaburu men, were captured

during the stay of the expedition in the neighbourhood. They are now undergoing sentence at Port Moresby, having had their queues cut off—this giving the authorities a hold over prisoners, as the possession of the hair is thought to give the possessor a power of bewitching the original owner. The party now proceeded eastward along the crest of the Puneaburu range, through frequent mist and rain. The whole country was forest-clad, involving incessant labour in cutting a track, while constant ascents and descents were necessary. The highest point reached was about 4500 feet above sea-level. On September 29 an open country was reached, and friendly relations established with a village of the Akaude tribe, who are at constant enmity with the Puneaburu and Dorevaida tribes, as well as their northern neighbours. It was found that the main water-parting had been crossed, the rivers now flowing north, apparently to the Musa, first explored by Sir W. Macgregor in 1895. Of these the Adau and Domara (both of which were heard of by Sir W. Macgregor as branches of the Musa) seem to unite to form the eastern branch of that river. A map, constructed by Captain Barton, accompanies the paper, and shows the Adaua as flowing south-west from the south side of Mount Suckling, and after traversing the Keveri valley, turning abruptly north through a deep gorge in the Mount Suckling range. This will not, therefore, constitute the main divide, as has hitherto been supposed. This is placed some 12 miles north of Cloudy bay, its elevation being here only 2300 feet. As before stated, however, the Puneaburu range, on which Mount Clarence is thought to lie, is considerably higher.

POLAR REGIONS.

Peary's Work in 1900 and 1901.—We have been favoured by the secretary of the Peary Arctic Club with copies of letters sent home last autumn by the explorer, describing in outline the operations of his expedition from May, 1900, to the date of the arrival of the *Eric* in the summer of 1901. On May 4, 1900, Peary, having sent back two natives he had with him from Cape Britannia (Cape North), continued along the Greenland coast with Henson and one Eskimo, reaching Lockwood's farthest on May 8, Cape Washington the next day, and the northern extremity of the land on May 13, in 83° 39′ N., 30° 20′ W. It was after the northward advance to 83° 50′ N. that the route was continued along the coast, the turning point being approximately in 83° N., 25° W., where dense fog, accompanied by a severe storm, made a further advance impossible. On the return open water was met with off various capes, rendering progress precarious at times. The animals shot or seen during the journey included musk-oxen, bears, a hare, a wolf, seals, and ptarmigan. Peary reached Fort Conger on June 10, and found that during his absence, Dr. Dedrich had secured a number of musk-oxen and seals, established caches, and brought up stores from the south. During the summer and autumn hunting was prosecuted in various directions, and was resumed again in the early part of 1901, much of the winter having been spent in igloos, built in the vicinity of the game killed in various localities. The start north was delayed, owing to the symptoms of anæmia manifested by all the party, and when, on April 5, Peary finally left Fort Conger with Henson and an Eskimo, it soon became evident that the condition of neither men nor dogs was such as to admit of a possibility of reaching the pole. Peary turned on reaching Lincoln bay, and having joined the rest of the expedition, the entire party moved south on April 17, soon getting news of the *Windward*, which Peary reached at Payer harbour on June 6. The ship was sawn free of the ice on July 3, and steamed across to Lyttelton island, afterwards proceeding to Whale sound before the arrival of the *Erik*. Peary hoped to explore the western side of Ellesmere Land during the autumn, and in the winter to collect a large quantity of dog-food at Cape D'Urville,

pushing on in the spring *viâ* Fort Conger to a point on the North Grinnel-land coast, and thence due north.

Proposed Expedition to the Northern Magnetic Pole.—An expedition is being organized in Christiania for the accurate determination of the present position of the northern magnetic pole, discovered by Sir James Ross in Boothia Felix in 1831. Its leader is to be Captain Roald Amundsen, who accompanied the Belgian Antarctic Expedition of 1897–99 as first officer, and is well qualified for the task by his training both as a seaman and as a magnetician. Last summer he made an experimental trip to the north in the Norwegian whaler *Gjöa*. It is uncertain whether the expedition will start during the present year or in 1903.

Arrival of the "Discovery" at Lyttelton, N.Z.—The arrival of the *Discovery* at Lyttelton, N.Z., at midnight, November 28, has been announced. The ship had entered the pack-ice in lat. 63·5°, long. 141° E., but pressure of time prevented a thorough investigation of the ice. Interesting collections have been made, and a party landed on Macquarie island for a few hours, obtaining some live penguins and their eggs, as well as some seals. The *Discovery* is said to have behaved admirably in rough weather. The small leak which had developed itself necessitated the ship's going into dry dock for caulking, but this proving ineffectual, the steel bow-plates were removed, and the cause of the leak discovered in some rivet holes which had been bored through the sheathing and planking. The defect has now been made good, and it was expected that the voyage would be continued on December 21. All on board were in excellent health and spirits.

The German Antarctic Expedition.—The *Times* correspondent at Cape Town announced the arrival there of the German antarctic ship *Gauss* on November 23. This date was, we believe, somewhat later than that put down in the programme of the voyage for arrival at Cape Town, but in spite of this the voyage seems to have been very successful, the soundings and other scientific observations having already given valuable results. On reaching the Cape Verde islands about the middle of September, Dr. von Drygalski despatched a first official report on the progress of the expedition to the Ministry of the Interior, and it has been since communicated to the public and printed in such journals as *Petermanns Mitteilungen* and the *Verhandlungen* of the Berlin Geographical Society. Down to the arrival at the Cape Verdes the weather had been entirely free from disturbances, and with the exception of a few hours near Madeira, the ship had proceeded under sail only. As a sailer the *Gauss* proved somewhat slower than had been hoped, even under a brisk breeze, 7 knots being the maximum speed yet attained. This may, it is thought, be due to the heavy load carried, and also to the fact that the hull had become somewhat foul. The ship left the Elbe on August 15, sighted Madeira on the 30th, but did not enter port, and dropped anchor in Porto Grande, São Vicente, on September 11. The scientific work commenced with the installation and testing of the various instruments. Successful soundings were carried out on the Josephine bank, giving as a result 487 metres (266 fathoms) in 37° 0′ N., 14° 4′ W., and 2490 metres (1361 fathoms) in 36° 42′ N., 14° 5′ W. Meteorological, physical, and biological observations had also been commenced, and the stay at Porto Grande was utilized for the careful determination of the amount of deviation on the *Gauss*, while a pendulum observation and geological and anthropometrical researches were carried out on shore. As regards the future work of the expedition, a third official statement has been issued in Germany, from which we gather the following additional details. It has been found necessary to charter a steamer to convey from Sydney to Kerguelen the dogs—procured at Vladivostok and presented to the expedition by a German commercial agent—the coal-supply (from New Zealand) to replenish

the stock consumed during the voyage out, and two scientific members of the Kerguelen scientific station. This vessel, which left Sydney on October 12, will await the arrival of the *Gauss* at Kerguelen and bring back the latest intelligence as to the course of the voyage. The work at the Kerguelen station will be carried on until March 1, 1903. International co-operation, especially in the matter of magnetic research, has been extended—beyond the share undertaken by the other antarctic expeditions—by the arrangement for observations, not only at the Argentine station on Staten island, but at other southern observatories, and even on ships making voyages beyond the 30th parallel. An important gap in the system has been filled by the establishment of a German station at Samoa. The observations will be continued from February 1, 1902, to March 1, 1903. The total estimated expense of the expedition has been considerably added to since the first estimate of £60,000 (apart from the Kerguelen station) was made. It is now reckoned at £75,000.

GENERAL.

The 'Geographical Teacher.'—The first number of the *Geographical Teacher*, the issue of which was recorded in the *Journal* for November, gives good promise that the magazine will prove of real value to the teachers of geography as a means of intercommunication for the exchange of ideas, and ventilation of difficulties met with in the work of improving the status of geographical education in this country. In an introductory statement explaining the objects held in view by its promoters, Mr. Freshfield once more dwells on the need that exists for such an improvement, though he sees encouraging signs that we are at last on the way to this end. Among the articles which deal with special aspects of geographical teaching, the following may be specially mentioned. Mr. T. G. Rooper describes in turn the various methods which have been introduced with success in Germany, all of which, he thinks, ought to be present to the mind in preparing the simplest course of lessons in geography. Mr. Andrews shows the use that may be made of maps for the purpose of correlating facts, the connection of which may not be obvious to the student at first sight, such as, *e.g.*, the rainfall of Africa and the main features of its vegetation. Dr. Herbertson insists on the importance of the study of the world as a whole as well as of the home district, pointing out the four principal distributions—configuration, climate, vegetation, and occupations of men, which must be studied in their broad outlines if geography is to be truly educative. An outline of the first of these distributions is given as a first instalment. Miss J. B. Reynolds discusses the objects to be aimed at in the organization of school excursions, and describes those which she has been able to carry out while teaching in an intermediate school at Cardiff, as well as one to the Lake District organized in 1900 in connection with the Girls' High School at Kendal. Mr. F. J. Wilkinson examines some recent examination papers in geography, and shows how far they still are from helping to call out the pupil's intelligence and reasoning powers, mere "memory questions" still forming a preponderating proportion of those set at such examinations as the Oxford and Cambridge Locals, that of the College of Preceptors, and the Military Entrance examination. This is sufficient to show that a good beginning has been made, and it is to be hoped, as Mr. Freshfield says, that the interest in the subject is sufficient to produce a body of capable contributors and interested readers such as may justify the continuance of the undertaking.

Formula for River-currents. Erratum.—In the note in the November number of the *Journal* on Herr Siedek's improved formula for the rate of currents in rivers, a mistake occurs in the fundamental equation for the speed of a normal stream. In the denominator of the fraction $\sqrt{B}$ should read $\sqrt[20]{B}$.

OBITUARY.

Edward John Eyre.

THE last survivor of the intrepid band of explorers who, in the middle decades of the nineteenth century, began to throw light on the vast interior of the Australian continent has passed away in the person of Edward John Eyre, who died at Walreddon Manor, Tavistock, on November 30 last. Born in 1815, Mr. Eyre had reached the advanced age of eighty-six, and so long a time had passed since the date of the events which brought his name prominently before the public that many

EDWARD JOHN EYRE.

probably have been surprised to learn that the early Australian explorer had so far outlived all his contemporaries as to see the opening of the twentieth century. The latter years of his life had been spent in retirement at his country home in Devonshire.

Edward John Eyre was the son of the Rev. Anthony Eyre, a Yorkshire clergyman, and was educated at Louth and Sedbergh Grammar Schools. At the age of

seventeen he went out to seek his fortune in Australia, devoting himself first to sheep-farming in New South Wales, and afterwards to the transport of stock from that colony to the then newly opened tracts of South Australia. Here he settled for a time on the lower Murray river, at a period when the attention of the colonists was eagerly directed to the possibility of the existence of tracts of pastoral country beyond the inhospitable zone which bounded the Adelaide district on the north and west. It was imagined that a route might be discovered leading to the pastoral districts west of the Great Australian bight, the country bordering which was then absolutely unknown. Mr. Eyre, however, was of opinion that a search towards the north was more likely to lead to good results, and on being placed in command of an expedition (1840), his first efforts were directed to this quarter of the compass. They all proved fruitless, the advance being stopped by the desolate, mud-fringed shores of Lake Torrens, and the explorer determined to change his plans and make one more attempt in a westerly direction along the shore of the great bight. On this hazardous enterprise he was accompanied only by one other white—a faithful servant who had been his factotum on the expedition—and three native boys, the rest of the party being sent back to Adelaide.

The hardships encountered by Mr. Eyre in this first plunge into the unknown deserts between South and Western Australia have had few parallels in the history of exploration. Water was met with at rare intervals and small quantity among the sandhills which occasionally vary the desolate surface of the country, and the transport of the impedimenta across the wide intervening spaces was, in the enfeebled condition of the horses, almost beyond the powers of the small company. When little more than half the distance to King George's sound had been traversed, and the party was thus far from all hope of relief, a catastrophe occurred, which left the leader with one native boy and practically no resources, 600 miles from the nearest settlement. This was the murder of his white companion by two of the natives, and the desertion of these with the greater part of the supplies. For some time Mr. Eyre and his one companion pushed on, killing the horses at intervals and supporting themselves on the flesh, until at last providentially relieved by a French whaler, which happened to be cruising in the bight; the remainder of the route to King George's sound being then safely accomplished. An account of this and earlier journeys was given in the thirteenth volume of the Society's *Journal*, and more in detail in a work entitled 'Journals of Expeditions of Discovery into Central Australia and overland to King George's Sound in 1840–41.'

With this memorable journey Mr. Eyre's geographical work ceased, and the remainder of his career can only be briefly touched upon. After holding the post of resident magistrate and protector of natives on the Murray river for a time, he returned to England in 1845, and received various colonial appointments, ending with that of Governor of Jamaica in 1864. Into the history of the stormy events connected with his governorship we cannot enter. For his conduct in the suppression of the Negro insurrection he was, as is well known, brought to trial on his return to this country, but was acquitted by the Grand Jury, and retired on a pension in 1864. For his great Australian journey he had received the Founder's medal of our Society in 1843, and had been, since the death of Sir Henry Rawlinson, the oldest surviving recipient of the honour.

Dr. John Stopford Taylor.

Dr. J. S. Taylor, who died at his residence, 6, Grove Park, Lodge Lane, Liverpool, on November 11, 1901, in his eightieth year, was one of our oldest members, having joined the Society as far back as 1854. He had long been known and

respected in Liverpool, in which city he was formerly medical officer of health, and an ardent pioneer of sanitary reform. Although rarely able to attend its meetings, he took a warm interest in everything connected with the Society, though he had for some time been in failing health. For some years previous to 1875 he had represented St. Anne's Ward on the Liverpool City Council.

CORRESPONDENCE.

"Ancient" Geography.

In the latest edition of the Admiralty's 'South American Pilot,' part i., 1893, I find (p. 249) the following description of the most thickly populated, richest, most fertile and productive province of the Argentine Republic:—

"The south bank of the Rio de la Plata is low, uniform, and uncultivated; the only objects visible from the offing are groups of trees, which are scattered along the coast, rendering the navigation near it difficult. This coast is the termination of the pampas of Buenos Aires, immense, monotonous plains, resembling the deserts of Africa, which extend to the chain of the Cordilleras, 420 miles to the westward. The only vegetation is an occasional ombu tree, the only large tree which grows in the pampas; it attains a height of 40 to 50 feet. There is no water but that from the marshes, and the only occasional inhabitants are a miserable tribe of Indians, who sometimes visit the coast for pillage. The great quantity of salt which is everywhere found on the soil renders this country uninhabitable."

G. E. C.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1901-1902.

Second Ordinary Meeting, November 25, 1901.—Sir Clements Markham, K.C.B., President, in the Chair.

Elections:—*Alexander V. Adiassewich; Captain Arthur Charles Aglionby*, 3rd *Batt. Connaught Rangers; John Gregory Apear; Frederick James Babb, B.Sc.; Robert Edward Bateman; T. A. V. Best, B.C.A. Administration; Neptune Blood; James D. Bourchier; Montgomerie Boyle; Rev. Frederick Brown; Captain Clarence Dalrymple Bruce, Duke of Wellington's Regiment; Alfred E. Carrier; Basil S. Cave, C.B.; David Paine Clark; Gerald C. Clark; Colonel J. Collinson, C.B., Northampton Regiment; Fergus Donovan; James H. Earls, M.D., L.S.A.; William Bateman Fairbairn; William Vere Reeve Fane; David Ferguson, M.I.M.E.; G. E. Franklin; Edward Wollaston Fritchley; Harry Bryant Green; William Hakes; R. W. Hamilton; Sydney Herbert; Lieut. Jessop Arthur Grey Hulton; Alleyne Ireland; T. N. Kelynack, M.D., M.R.C.P.; Arthur Barton Kent; Hermann Karl Wilhelm Kumm; Herbert Rowe Leetham; Major Leonard; Rev. Thomas Lewis; John Livingstone; R. Popham Lobb; Lionel William Lyde; Maurice Marsden; Alfred Ed. Woodley Mason; George Torrance Milne; Captain R. H. Monck-Mason, Royal Munster Fusiliers; Dr. E. Rice Morgan; Henry Melvil Napier; Anthony Nicholl; Alwyn Parker; W. Coulson Parkinson L.C.C.; Robert Wm. Partridge; Jas. Bruce Pearson, Commr. B.I.S. Nav. Co.; Chas. Pobee; Hesketh Prichard; Cornelius Edward Probyn; Gilbert Purvis; Rev. Jno. Bremner Purvis; Alex. Hamilton Rice; Wm. Hugh Riley-Pearson;*

Robert Dawson Rudolf, M.D. Edin., M.R.C.P. Lond.; Captain Upton Ruxton; Harold Sessions, F.R.C.V.S., Veterinary Surgeon in employ of British War Office; Emilio Silvestri; Charles T. Spencer; James Stuart, M.A.; Captain F. A. Tighe, R.F.A.; Paul Robinson Tingley; Robert Woolley Walden; Gerard Anstruther Wathen, B.A.; Louis Webb; Dr. A. G. Welsford, M.D.; Alfred John West; Henry St. John Wileman; Herbert Williams; Rev. James Wolfenden, D.D.; Captain M. E. Willoughby, 2nd Bengal Lancers, D.A.A.G. Bengal Command; Sub-Lieut. Jno. George Wood, R.N.R., Navigating Officer, White Star Line; Percy Wyndham, B.A., Indian Civil Service.

HONORARY CORRESPONDING MEMBER.

Captain Ernesto de Vasconcellos (Secretary of the Geographical Society of Lisbon).

The Paper read was:—

"A Fourth Journey in Persia, 1897–1901." By Major Molesworth Sykes.

Dr. Vaughan Cornish exhibited a cinematograph representation of the Severn bore.

Third Ordinary Meeting, December 9, 1901.—Sir CLEMENTS MARKHAM, K.C.B., President, in the Chair.

ELECTIONS.—*Robert L. Barrett, B.A.; Clement Cyril Carter, B.A.; Rev. Eyre Chatterton; John Charles Codrington Coxhead; Robert Alexander Currie; Francis Druce, M.A., Oxon., F.R. Met. Soc.; Rev. George William Hanford, M.A. Camb.; Lieut.-Colonel J. Hayes-Sadler, H.B.M. Consul-General, Somaliland; Rev. J. Jeffrey Johnstone; Charles McKinnon; Mark F. Miller; Joseph J. Nunan; Colonel Gordon Ponsonby; Frederick Schlusser; Philip Hamelton Selby; Arthur Senior; Clarence Gilbert Wood.*

THE "DISCOVERY"; THE LATE EDWARD JOHN EYRE.

The PRESIDENT said: I think we must congratulate ourselves on the very successful voyage of the *Discovery*, which arrived at Lyttelton, New Zealand, ten days ago. She made up entirely for the loss of time in the Atlantic; for the *Discovery* is a ship for bad weather and heavy seas, and is not so well adapted for the calms of the equator and trade winds. She not only made a very rapid voyage, but also succeeded in taking deep-sea soundings and making a complete series of magnetic observations. Our explorers are now about to enter the Antarctic sea on a perilous but very important service. It only remains for us to send them out next summer a relief ship. This is absolutely necessary. It has been very hard work to collect the funds for it, and it is still hard work; but it has to be done, and I think I can promise you that it shall be done.

We must for one moment refer to the loss of the father of our Gold Medallists, the late Mr. Eyre, who died at a good old age. It was before most of us were born that the great Australian explorer made that wonderful journey from Adelaide to King George's Sound. It was only about three years ago that I received a letter from him, thanking me for the invitation to meet some of the premiers of the colonies—colonies which he once knew so well, and which still remember him; and it was only about a fortnight before he died that his wife sent us a photograph of our venerable Gold Medallist, who has now passed away at the age of eighty-six.

The Paper read was:—

"The Glaciers of Kangchenjunga." By Douglas W. Freshfield, Esq.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. = Memoirs, Mémoires.
Met. = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Adriatic Sea. *Vierteljahrshefte G. Unterricht* 1 (1901): 30–36. **Luksch.**

Das Seeboden-Relief des Adriatischen Meeres. Von Prof. J. Luksch. *With Map.*

Austria—Alps. *Vierteljahrshefte G. Unterricht* 1 (1901): 17–30. **Giannoni.**

Der historische Atlas der österreichischen Alpenländer und die Grundkartenfrage. Von Dr. C. Giannoni.

Austria—Dolomites. **Mundt.**

Engadin-Ortler-Dolomiten. Von Theodor und Maud Wundt. Zweite Auflage. Stuttgart: Greiner und Pfeiffer. (Not dated.) Size 11 × 7½, pp. 276. *Illustrations.*

One of the profusely illustrated records of mountain climbing occasionally issued under the auspices of the continental Alpine clubs.

Austria—Silesia. **Fox.**

Das Gesenke. Eine Passstudie. Von Dr. Robert Fox. Festschrift des Geograph. Seminars der Universität Breslau zur Begrüssung des XIII. Deutschen Geographentages. Pp. 178–189. Breslau, 1901. Size 9½ × 6½.

On a celebrated pass through the mountains of Silesia.

Austria—Vienna. **Hann.**

Die Meteorologie von Wien nach den Beobachtungen an der K. K. Meteorologischen Central-Anstalt 1852–1900. Von Julius Hann. Wein, 1901. Size 12½ × 9½, pp. 62.

Danube—Iron Gate. **Eyth.**

XVII.—XIX. Jahresb. (1898–1900) *Württemberg. V. Handelsg.* (1901): 3–31.

Die Sprengung des Eisernen Thors und die freie Donauschiffahrt. Von M. v. Eyth.

Europe—Military Geography. **Dentzer.**

Topographie der Feldzüge Robert Guiscards gegen das byzantinische Reich. Von Dr. Bernhard Dentzer. Festschrift des Geograph. Seminars der Universität Breslau zur Begrüssung des XIII. Deutschen Geographentages. Pp. 82–121. Breslau, 1901. Size 9½ × 6½.

The campaign was undertaken in the year 1081.

Switzerland. *Jahrb. Schweiz. Alpenclub.* **36** (1900–1901): 210–232. **Dübi.**
Bergreisen und Bergsteigen in der Schweiz vor dem 19. Jahrhundert. Von Dr. H. Dübi. *With Illustrations.*

Switzerland. *Le Globe, B.S.G. Genève* **40** (1901): 117–134. **Schenk.**
Les populations primitives de la Suisse. Par M. le Dr. Alex. Schenk.

Switzerland—Anthropology. *B.S. Neuchateloise G.* **13** (1901): 5–52. **Schenk.**
Matériaux pour l'anthropologie des populations primitives de la Suisse. Par le Dr. Alexandre Schenk. *With Illustrations.*

Switzerland—Geneva. **Pidoux.**
Mém. S. Phys. et d'Hist. Nat. Genève **33**, No. 3 (1900): pp. 68.
Mémoire sur la latitude de l'Observatoire de Genève. Par Justin Pidoux.

Switzerland—Glacier-burst. *G.Z.* **7** (1901): 459–461. **Richter.**
Der Gletschersturz von Simpeln am 19. März 1901. Von E. Richter.

Switzerland—Lake of Geneva. *Le Globe, B.S.G. Genève* **40** (1901): 113–117. **Forel.**
Les seiches de Genève. Par M. le prof. Dr. F. A. Forel. (*Résumé.*)

Switzerland—Map. *Le Globe, Mem. S.G. Genève* **40** (1901): 55–71. **Lochmann.**
La nouvelle carte murale de la Suisse pour les écoles. Par le Colonel J. J. Lochmann.

Turkey—Macedonia. *Izvestiya Imp. Russ. G.S.* **37** (1901): 79–131. **Bashmakov.**
A Journey in Macedonia. By A. A. Bashmakov. *With Map.* [In Russian.]

United Kingdom—Forestry. *Nineteenth Century* **50** (1901): 564–578. **Maxwell.**
The Sad Plight of British Forestry. By the Right Hon. Sir Herbert Maxwell.

United Kingdom—Ireland—Botany. **Praeger.**
P.R. Irish A. **7** (1901): pp. clxxxviii. and 410.
Irish Topographical Botany. Compiled by R. L. Praeger. *With Maps.*
This will be the subject of a note.

United Kingdom—Lake District. **Bradley.**
"Highways and Byways in the Lake District." By A. G. Bradley, with Illustrations by Joseph Pennell. London: Macmillan & Co., 1901. Size 8 × 5½, pp. xii. and 332. *Map and Illustrations. Price* 6*s. Presented by the Publishers.*
This work is concerned rather with the highways than the byways of the Lake District, and includes within its purview much of the outlying country not usually embraced under that designation. Historical reminiscences and sketches of the life of the people form a great part of the volume. The author is no doubt right in supposing that by devoting his attention wholly to the scenic beauties of the district, he would fail in producing a readable volume, but it may be perhaps thought that he has fallen into the opposite error, and been too chary in his descriptions of the romantic recesses of dale and mountain, an adequate knowledge of which cannot be gained without leaving the highways. The illustrations give somewhat free renderings of the scenes depicted, which it would be sometimes hard to identify from them.

United Kingdom—Lancashire. **Tiddeman.**
P. Yorkshire Geolog. and Polytechnic S. **14** (1901): 178–182.
Notes on the Geology of Clitheroe and Pendle Hill. By R. H. Tiddeman.

United Kingdom—Scotland. *Scottish G. Mag.* **17** (1901): 399–414. **Cash.**
The First Topographical Survey of Scotland. By C. G. Cash.
This is the subject of a note in the *Journal* for December.

United Kingdom—Tide Tables. **Harris and Havergal.**
Tide Tables for the British and Irish Ports for the year 1902: also the times and heights of high water at full and change for the principal places of the globe. By Captain H. R. Harris, R.N., and Commander A. Havergal, R.N. London: J. L. Potter. Size 10 × 6. *Presented by the Hydrographer.*

United Kingdom—Yorkshire. **Baddeley.**
Thorough Guide Series. Yorkshire (Part ii.). West and part of North Ridings and all parts of the country west of the N.E. Main Line, also Barnard Castle and Teesdale. By M. J. B. Baddeley, B.A. Fourth Edition. London: Dulau & Co.,

1901. Size 6½ × 4½, pp. xvi. and 152. *Maps and Plans. Price* 3*s. Presented by the Publishers.*

This excellent guide has been further improved in the present edition by the addition of contoured maps, on the scale of ½ inch to a mile, of the chief tourist parts of Wharfedale, Wensleydale, and Swaledale.

United Kingdom—Yorkshire. **Hughes.**

P. Yorkshire Geolog. and Polytechnic S. **14** (1901): 125–150.

Ingleborough. Part. i. Physical Geography. By Prof. T. McK. Hughes. *With Illustrations.*

United Kingdom—Yorkshire. **Monckman.**

P. Yorkshire Geolog. and Polytechnic S. **14** (1901): 151–158.

The glacial Geology of Bradford, and the Evidence obtained from Recent Excavations of a Limestone Track on the South Side of the Valley. By James Monckman, D.SC. *With Map.*

ASIA.

Asia—Travel. **Cotes.**

Westward from the Golden Gate. By Annie Russell Cotes. London: printed by W. H. and L. Collingridge. (Not dated.) Size 9 × 7½, pp. 160. *Maps and Illustrations. Presented by the Author.*

The privately printed account of a tour in 1885–86 round Eastern and Southern Asia, dealing principally with Japan, Hong-kong, Ceylon, and India.

Ceylon. **Ferguson.**

The Ceylon Handbook and Directory and Compendium of Useful Information, to which is prefixed a Review of the Planting Enterprise and Agriculture of the Colony; with Statistical Information referring to the Planting Enterprise in other countries. Compiled and edited by J. Ferguson. Colombo: A. M. & J. Ferguson, 1901. Size 8½ × 5½, pp. lxvi. and 1404. *Map, Plan, and Illustrations. Presented by the Compiler.*

Ceylon. *Quart. J. Geol. Soc.* **57** (1901): 198–209. **Parkinson.**

Notes on the Geology of South-Central Ceylon. By John Parkinson. Size 8½ × 5½. *Sketch-map and Illustrations. Also separate copy, presented by the Author.*

China. **Kopsch.**

Britain's Trade with China. By H. Kopsch. (From the *Empire Review*, September, 1901, pp. 236–252.) Size 10 × 6½. *Presented by the Author.*

China. **Parker.**

John Chinaman and a few others. By E. H. Parker. London: John Murray, 1901. Size 8½ × 5½, pp. xx. and 380. *Illustrations. Price* 8*s. net. Presented by the Publisher.*

A series of vivid sketches of Chinese character, drawn from the writer's personal experience gained during his long period of consular service. The book deserves to be read by all responsible in any way for the direction of European relations with China. It sheds a valuable light on Chinese methods and modes of thought, a failure to recognize and make allowance for which may have, the author thinks, disastrous consequences.

Malay States—Negri Sembilan. **Campbell.**

Federated Malay States. Annual Report on the State of Negri Sembilan for the year 1900. By D. G. Campbell. Kuala Lumpur, 1901. Size 13½ × 8½, pp. 10 and xxii.

Coffee-growers had to contend against low prices and a plague of caterpillars, and the rice crop was generally poor. The value of tin exported was some 25 per cent. higher than in 1899.

Malay States—Pahang. **Clifford.**

Federated Malay States. Annual Report of the State of Pahang for the year 1900. By Hugh Clifford. Kuala Lumpur: 1901. Size 13½ × 8½, pp. 22 and xx.

The mining results in 1900 are said to be not encouraging, any development of the country from this point of view requiring European capital.

Malay States—Perak. **Walker.**

Perak Administration Report for the year 1900. By Colonel R. S. F. Walker, C.M.G. Taiping. Size 13 × 8½, pp. 64. *Diagram.*

Malay States—Selangor. **Belfield.**

Selangor Administration Report for the year 1900. By H. Conway Belfield. Kuala Lumpur, 1901. Size 13½ × 8½, pp. 24 and xxxiv.

Persia—Azerbaijan. **Wood.**

Trade of Azerbaijan for the year 1900. Foreign Office, Annual No. 2685, 1901. Size 9½ × 6, pp. 20. *Diagram.* *Price* 4½*d.*

Philippine Islands.

Special Report of the United States Board on Geographic names relating to the Geographic Names in the Philippine Islands. Washington: 1901. Size 9 × 6, pp. 60.

See note in the Monthly Record for December (p. 620).

Red Sea. *Deutsche Kolonialzeitung* **18** (1901): 350-351. **Bruchhausen.**

Eine deutsche Kohlenstation im Roten Meere. Von Major Karl von Bruchhausen. *With Maps.*

On the coaling-station lately established on the island of Kumh, in the Farsan group.

Russia—Siberia. *National G. Mag.* **12** (1901): 317-324. **Grosvenor.**

Siberia. By Prof. Edwin Grosvenor.

The writer draws a vivid picture of the part which, in his opinion, Siberia is to play in the future.

Russian Central Asia. *Zemlevedenie* **8** (1901): 1-26. **Bogoyavlensky.**

The Upper Amu Darya. By N. Bogoyavlensky. *With Illustrations.*

A note on this paper was given in the December number (vol. xviii. p. 618).

Siam—Bangkok. **Carlisle.**

Trade of Consular District of Bangkok for the year 1900. Foreign Office, Annual No. 2705, 1901. Size 9½ × 6, pp. 16. *Price* 1*d.*

Siam—Chiengmai. **Beckett.**

Trade of Chiengmai for the year 1900. Foreign Office, Annual No. 2717, 1901. Size 9½ × 6, pp. 14. *Price* 1*d.*

Siam—Nan. **Lyle.**

Trade of Nan for the year 1900. Foreign Office, Annual No. 2720, 1901. Size 9½ × 6, pp. 8. *Price* ½*d.*

Turkey—Armenia. **Belck.**

Jahresb. Frankfurter V. G. u. Statistik **64** *and* **65** (1899-1901): 127-137.

Armenien im Altertum und in der Jetztzeit. Von Dr. Waldemar Belck.

Turkey—Baghdad. **Melvill.**

Trade of Baghdad for the year 1900. Foreign Office, Annual No. 2707, 1901. Size 9½ × 9. *Price* ½*d.*

Turkey—Harpoot. *Monthly Weather Rev.* **29** (1901): 250-253. **Huntingdon.**

The climate of Harpoot, Turkey in Asia. By Prof. Ellsworth Huntingdon.

Turkey—Kurdistan. **Maunsell.**

Central Kurdistan. By Major F. R. Maunsell. (From the *Geographical Journal* for August, 1901.) Size 10 × 6½, pp. 24. *Map.*

AFRICA.

Canary Islands—Historical. **Müller.**

Die Kunde des Altertums von den Canarischen Inseln. Von Curt Müller.—Festschrift des Geograph. Seminars der Universität Breslau zur Begrüssung des XIII. Deutschen Geographentages. Pp. 38-64. *Sketch-map.* Breslau, 1901. Size 9½ × 6½.

Cape Colony. *Fortnightly Rev.* **70** (1901): 213-221. **Firth.**

The Albany Settlement. By J. B. Firth.

A sketch of the origin and history of the experiment at colonization made at Albany eighty years ago.

Cape Colony. *T.S. African Philosoph. S.* **11** (1901): 161–168. **Marloth.**

Notes on the Occurrence of Alpine Types in the Vegetation of the Higher Peaks of the South-Western Region of the Cape. By R. Marloth, PH.D. *With Plates.*

On five peaks with an altitude exceeding 6000 feet (at which height the alpine types first begin to appear) the writer gathered seventy-two species of plants, a list of which is given.

German South-West Africa. **Düttmann.**

Beiträge Kolonialpolitik **2** (1900–1901): 612–616.

Kurze Reiseerinnerungen aus dem Nordwesten Deutsch-Südwest-Afrikas, und dem südlichen Angola. Von E. Düttmann.

Gold Coast. *B.S. Neuchateloise G.* **13** (1901): 148–154. **Perregaux.**

La Côte d'Or comme pays aurifère. Par E. Perregaux.

Kamerun. *Beiträge Kolonialpolitik* **3** (1901–1902): 138–148. **Spellenberg.**

Bericht über meine dritte Reise ins N.-W.-Gebiet des Hinterlandes von Kamerun. Von G. Spellenberg.

The author is a missionary who in 1900 pushed beyond the headwaters of the Mungo to the northern border of the Bakundu country, returning to the coast by a new route west of the Kamerun peak, of which the complete circuit was finally made.

Kamerun. *Deutsch. Kolonialblatt* **12** (1901): 595–597. ——

Bereisung des Gebietes südlich und südöstlich von Joko. *With Sketch-Map.*

Adds somewhat to our knowledge of the Upper Sanaga basin.

Madeira. **Biddle.**

The Land of the Wine, being an account of the Madeira Islands, at the beginning of the Twentieth Century, and from a new point of view. By A. J. Drexel Biddle. 2 vols. Vol. i. Comprising the History of the Madeiras; information for the Traveller and Visitor, and a Treatise on the Geography, Geology, and Climate. Vol. ii. Treating of the Natives, their characteristics, religion, laws, and customs; the Commerce; the Flora; the Vine and the Wine; and the Fauna. London, etc.: Drexel Biddle, 1901. Size 9 × 6, pp. (vol. i.) 268; (vol. ii.) 300. *Maps and Illustrations. Presented by the Author.*

A large amount of information is presented in these volumes, but no attempt has been made to weave it into a connected narrative. The second volume is avowedly devoted to more technical questions, but the first also is rather too much a congeries of isolated facts. What the new point of view is does not appear, unless it be that, in the author's opinion, Madeiran history has hitherto been regarded in too close association with that of Portugal. As a work of reference the book may be useful, and it is illustrated by some excellent reproductions of photographs.

Madeira and Canary Islands, etc. **Brown.**

Madeira and the Canary Islands with the Azores. A Practical and Complete Guide for the use of Invalids and Tourists, with Twenty Coloured Maps and Plans and numerous Sectional and other Diagrams. By A. Samler Brown. Sixth edition. London: Low & Co., 1901. Size 7½ × 5, pp. xviii. and 339. *Price* 2*s.* 6*d. Presented by the Publishers.*

Besides being brought generally up to date, this useful guide has been extended, in the present edition, by the addition of a section on the Azores.

Morocco. *Jahresb. Frankfurter V.G. u. Statistik* **64** *and* **65** (1899–1901): 5–88. **Arnold.**

Vier Karten und Studien zur Wirthschafts-geographie von Marokko. Von Dr. R. Arnold. *With Maps.*

Morocco. *Monthly Rev.* **5** (1901): 89–102. **Bishop.**

Notes on Morocco. By Isabella L. Bishop.

Morocco. **Meakin.**

The Land of the Moors. A Comprehensive Description. By Budgett Meakin. London: Sonnenschein & Co., 1901. Size 9 × 6, pp. xxxii. and 464. *Map and Illustrations. Presented by the Publishers.*

This will be specially noticed.

Natal. **Gray.**

Report on the Mining Industry of Natal for the year 1900. By G. J. Gray, Pietermaritzburg, 1901. Size 13½ × 8½, pp. 72. *Maps and Sections.*

North Africa. *Blackwood's Mag.* **170** (1901): 545–558. **Harris.**
The Moslem Confraternities of North Africa. By Walter B. Harris.

Portuguese East Africa. *B.S.G. Lisboa* **17** (1898–1899): 583–589. **Costa.**
Notas para o Diccionario Chorographico da Provincia de Moçambique por Gomes da Costa.
Notes on places and physical features in Mozambique.

Portuguese East Africa—Historical. **Liengme.**
B.S. Neuchateloise G. **13** (1901): 99–135.
Un potentat africain: Goungounyane et son règne. Par le Dr. Liengme. *With Illustrations.*

Sahara. *C. Rd.* **133** (1901): 349–351. **Collot.**
Goniatites carbonifères dans le Sahara. Note de M. Collot.
The fossils here described were found between Figuig and Igli.

St. Helena. **Sterndale.**
St. Helena. Report for 1900. Colonial Reports, Annual No. 323, 1901. Size 9½ × 6, pp. 18. *Price* 1½*d.*

Somaliland. *P. Zoolog. S.* 1901 (vol. ii.): 298–316. **Sharpe.**
On a Collection of Birds made by Dr. Donaldson Smith in Northern Somaliland. By R. Bowdler Sharpe, LL.D.

South Africa. *J.R. United Service I.* **45** (1901): 948–961. **Zietsman.**
The Native Question in South Africa. By the Hon. L. Zietsman.

South Africa—Historical. *Nineteenth Century* **50** (1901): 402–416. **Wirgman.**
The First British Settlers in South Africa. By the Rev. Dr. Wirgman.

Tunis. *B.S. Languedoc. G.* **23** (1900): 274–290; **24** (1901): 26–41. **Bordier.**
La Tunisie en 1900. Par le Commandant Désiré Bordier. *With Illustrations.*

Tunis. *B.S.G. Com. Havre* **18** (1901): 340–349. **Menager.**
La Politique Coloniale. L'invasion sicilienne en Tunisie. Par E. Menager.
Translation of an article in an Italian paper.

Uganda—Mammals. *P. Zoolog. S.* 1901 (vol. ii.): 85–90. **Thomas.**
On the more notable Mammals obtained by Sir Harry Johnston in the Uganda Protectorate. By Oldfield Thomas. *With Plate.*

West Africa. **Alldridge.**
The Sherbro and its Hinterland. By T. J. Alldridge. London: Macmillan & Co., 1901. Size 9 × 6, pp. xvi. and 356. *Map and Illustrations. Price* 15*s. net. Two copies, one presented by the Author, the other by the Publishers.*
This will be specially noticed.

West Africa—Climate. *Climate* **3** (1901): 20–25. **Harford-Battersby.**
The West African Climate. By the Editor. *With Illustrations.*

Zanzibar. **Cave.**
Trade of Zanzibar for the year 1900. Foreign Office, Annual No. 2718, 1901. Size 9½ × 6, pp. 22. *Price* 1½*d.*

NORTH AMERICA.

Alaska—Willows. *P. Washington A. Sci.* **3** (1901): 297–362. **Coville.**
Papers from the Harriman Alaska Expedition. XXIV. The Willows of Alaska. By Frederick V. Coville. *With Plates.*

Alaska and the Yellowstone. **Taylor.**
Touring Alaska and the Yellowstone. By Charles M. Taylor, jun. Philadelphia: George W. Jacobs & Co., 1901. Size 8 × 5½, pp. 388. *Illustrations. Price* $1.60 *net. Presented by the Author.*

Mr. Taylor is well known as the author of various brightly written sketches of travel of a popular character. The present work gives a good idea of the nature of the Alaskan coast-region, including the White Pass route to Lake Bennett, besides describing the route across Canada, and a visit to the Yellowstone. The book is tastefully got up, and its size has wisely been kept within unpretentious limits.

America—Name. *Riv. G. Italiana* **8** (1901): 555–571. **Rambaldi.**

Per la storia del nome "America." Nota del Prof. P. L. Rambaldi.

United States—Maryland. ———

Maryland and its Natural Resources. Prepared by the Maryland Geological Survey. Wm. Bullock Clark, State Geologist. Official Publication of the Maryland Commissioners, Pan-American Exposition. Baltimore, 1901. Size 9 × 6. *With Map.*

United States—Trade. **Hitchcock.**

Distribution of the Agricultural Exports of the United States. 1894–1898. By Frank H. Hitchcock. Washington, 1899. Pp. 154. Agricultural Exports of the United States by Countries, 1895–1899. By the same. Washington, 1900. Pp. 88. Agricultural Imports of the United States by Countries, 1895–1899. By the same. Washington, 1900. Pp. 74. (U.S. Department of Agriculture, Bulletins 16, 20, 21.) Size 9 × 6. *Presented by the U.S. Department of Agriculture.*

CENTRAL AND SOUTH AMERICA.

Bolivia. **Church.**

Northern Bolivia and President Pando's New Map. By Colonel George Earl Church. (From the *Geogr. Journal* for August, 1901.) Size 10 × 6½, pp. 10. *Map.*

Brazil. *Meteorolog. Z.* **18** (1901): 385–405. **Draenert.**

Das Höhenklima von Uberaba, Central-Brasilien. Von Prof. F. M. Draenert.

Brazil. *Globus* **80** (1901): 242–243. **Schulze.**

Die erste ethnographische Skizze über die Botokuden in deutscher Sprache. Von Franz Schulze.

On the account by one of Cabral's companions, which was translated through Italian into German, appearing in 1508 in the collection of Jobst Ruchamer.

Brazil—Amazon. **Todd.**

Beiträge Kolonialpolitik **3** (1901–1902): 11–22, 51–59.

Die Reise des amerikanischen Kanonenbootes Wilmington auf dem Amazonenstrom. Amtlicher Bericht des Kapitäns Z. D. Todd. *With Illustrations.*

Translation of the original report. The voyage was alluded to in vol. xiv. of the *Journal* (p. 567).

Brazil—Bibliography. **Phillips.**

A List of Books, Magazine Articles, and Maps relating to Brazil. 1800–1900. Prepared by P. Lee Phillips. A Supplement to the Handbook of Brazil (1901), compiled by the Bureau of the American Republics. Washington, 1901. Size 9½ × 6, pp. 146. *Presented by the Compiler.*

A useful compilation, though some important omissions occur. Thus Dr. Crevaux's name does not appear at all, and M. Coudreau's latest work, on the Trombetas, is not entered. The separation of books from articles in periodicals seems unnecessary, and in the absence of distinctive headlines is likely to cause confusion.

Brazil—Rio Grande do Sul. **Staniforth.**

Trade of Consular District of Rio Grande do Sul for the years 1899 and 1900. Foreign Office, Annual No. 2702, 1901. Size 9½ × 6, pp. 16. *Diagram. Price* 3*d.*

Brazil and Argentine Republic. ———

Homenaje al Presidente Dr. Campos Salles. El Brasil y la Argentina. Confraternidad Sud-Americana. Buenos Aires, 1901. Size 12½ × 9, pp. xviii. and 462. *Illustrations. Presented by Dr. F. P. Moreno.*

Official account of a visit to Brazil by the Argentine President in 1899, and of the return visit of the Brazilian President in 1900. It contains a number of photographic illustrations of the cities of Buenos Aires and Rio Janeiro.

Chile. *Meteorolog. Z.* **18** (1901): 406–412. **Martin.**

Der Regen in Südchile. Von Dr. K. Martin.

Chile—Frontier Question. **Figueroa.**

El Problema de nuestras Fronteras del Norte. Tacna y Arica. Por Pedro Pablo Figueroa. Santiago de Chile, 1900. Size 8½ × 5½, pp. 30.

Costa Rica and Columbia. *B.I. Fis.-G. Costa Rica* **1** (1901): 135–145. ———

Los "Geographiche Mitteilungen," y la frontera entre Costa Rica y Colombia.

The writer criticizes the views of Prof. Seler expressed in his article in *Petermanns*

Mitteilungen, and gives a map on which the frontier is drawn more to the benefit of Costa Rica. It is difficult, however, to reconcile the boundary-line here drawn with the natural interpretation of the award (see note, *ante*, p. 93).

Cuba. **Carden.**

Trade of the Island of Cuba for the year 1900. Foreign Office, Annual No. 2674, 1901. Size 9¼ × 6, pp. 38. *Price* 2½*d.*

Although the year 1900 was marked by much commercial depression, signs of improvement are said to be everywhere visible.

French Guiana. **Hoarau-Desruisseaux.**

Ministère des Colonies, Feuille de Renseignements l'Office Colon. **3** (1901): 3–4.

Les Mines et l'industrie minière de la Guyane française. Rapport de M. l'Inspecteur des colonies Hoarau-Desruisseaux.

Leeward Islands. *Monthly Weather Rev.* **29** (1901): 254–256. **Alexander.**

Reforestation and Rainfall in the Leeward Islands. By W. H. Alexander. *With Sketch-map.*

Panama Canal. *P.I. Civil Engineers* **144** (1901): 150–214. **Ford.**

The Present Condition and Prospects of the Panama Canal Works. By J. T. Ford. *With Map and Sections.*

The author takes a sanguine view of the prospects of the canal operations.

Paraguay. **Bolland.**

Exploraciones practicadas en el Alto Paraguay y en la Laguna Gaiba por el capitán de marina Enrique Bolland. Fundación de un Puerto. Buenos Aires, 1901. Size 10½ × 7, pp. 144. *Maps and Illustrations.*

This will be the subject of a notice.

Turks and Caicos Islands. **St. Aubyn.**

Turks and Caicos Islands. Report for 1900. Colonial Reports, Annual No. 328, 1901. Size 9½ × 6, pp. 22. *Price* 1½*d.*

POLAR REGIONS.

Arctic—Position-finding. *Blackwood's Mag.* **170** (1901): 476–483. ———

Finding the Way to the Pole.

On the difficulties in the way of determining the position in the arctic, with special reference to Nansen's expedition.

Spitsbergen. **Römer.**

Jahresb. Frankfurter V.G. u. Statistik **64** *and* **65** (1899–1901): 160–163.

Auf einem deutschen Fischdampfer um Spitsbergen und König-Karlsland. Von Dr. F. Romer.

Spitsbergen—King Charles' Land. **Nathorst.**

Bidrag till Kung Karls lands geologi. Af A. G. Nathorst. (Geol. Fören. Förhandl., No. 208, Bd. 23, Häft 5, pp. 341–378.) *Maps and Illustrations. Presented by the Author.*

Based on the results of the author's expedition of 1898.

MATHEMATICAL GEOGRAPHY.

Astronomy. ———

Tychonis Brahe Dani die XXIV. Octobris A.D. MDCI defuncti, operum primitias de Nova Stella summi civis memor denuo edidit Regia Societas Scientiarum Danica. Hauniæ, 1901. Size 10½ × 8. *Presented by the Royal Danish Society of Sciences.*

Astronomy. **Zhdanko.**

Tables of the Corrected Azimuths of the Sun (in Continuation of Bardwood's Tables). (In Russian.) St. Petersburg, 1900. Size 9½ × 7, pp. vi. and 182.

Compass-deviations. **Evans and Smith.**

Admiralty Manual for the Deviations of the Compass. Originally edited in 1862 by F. J. Evans and Archibald Smith. Seventh Edition. London: J. D. Potter, 1901. Size 10 × 6, pp. x. and 212. *Diagrams. Price* 3*s. Presented by the Hydrographer, Admiralty.*

Geodesy. *C. Rd.* **133** (1901): 607–613, 666–670. **Hatt.**

Jonction d'un réseau fermé de triangulation. Note de M. P. Hatt.

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Geomorphology. *Science* **14** (1901): 184–185. **Branner.**

The Origin of Travertine Falls and Reefs. By Prof. J. C. Branner.

Glaciers. *Nature* **64** (1901): 399–400. **Buchanan.**

The Size of the Ice-grain in Glaciers. By J. Y. Buchanan.

Glaciers. **Rabot.**

Les variations de longueur des glaciers dans les régions arctiques et boréales Par Charles Rabot. (Extrait des *Archives des sciences physiques et naturelles*, Annés 1899 et 1900.) Genève et Bale, Georg & Co., 1900. Size 9½ × 6½, pp. 250.

Meteorology—Atlantic. **Knipping.**

Sturmtabellen für den Atlantischen Ozean. Von E. Knipping. Beiheft I. zu den Annalen der Hydrographie und Maritimen Meteorologie, Heft VIII. (August), 1901. Berlin: E. S. Mittler und Sohn. Size 10½ × 7½, pp. 20. *Diagrams.*

Meteorology—Auroras. *C. Rd.* **133** (1901): 279–281. **Stassano.**

Démonstration géographique de l'origine terrestre des aurores polaires. Note de M. Henri Stassano.

Meteorology—Föhn. **Höfler.**

Jahresb. Frankfurter V.G. u. Statistik **64** *and* **65** (1899–1901): 145–150.

Die Entstehung des Föhns. Von Prof. Dr. Höfler.

Methods of Observation. **Buchanan.**

Chemical and Physical Notes. By J. Y. Buchanan. Reprinted from 'The Antarctic Manual,' 1901, chapter ix. pp. 71–175. *With Illustration.* Size 9 × 6, pp. 107. London, 1901.

Mountain-building. *Deutsche Rundschau G.* **24** (1901): 1–10. **Müller.**

Die Schrumpfungstheorie im Lichte der Kritik. Von P. Johannes Müller.

Mountains. *Scottish G. Mag.* **17** (1901): 449–459. **Geikie.**

Mountains. By Prof. James Geikie, F.R.S. *With Sections.*

Describes the different types of mountain structure.

Oceanography. *B.S.G. Comm. Bordeaux* **27** (1901): 34–40, 55–61, 69–77. **Thoulet.**

Conférence internationale pour l'étude de la mer, Stockholm, 1899. Par M. J. Thoulet. *With Sketch-maps.*

Oceanography—Currents. *National G. Mag.* **12** (1901): 337–339. **Page.**

The Drift of Floating Bottles in the Pacific Ocean. By James Page.

Oceanography—Methods. *La G., B.S.G. Paris* **4** (1901): 168–171. **Gasnier.**

Thermomètres électriques de profondeur. Par P. Gasnier.

Oceanography—North Atlantic. **Antze.**

Revision der Oberflächenströmungen des nordatlantischen Ozeans auf Grund der Triftphänomene. Inaugural-Dissertation zur Erlangung der Doktorwürde der hohen philosophischen Fakultät der Christian-Albrechts-Universität in Kiel vorgelegt von Gustav Antze. Minden i. W., J. C. C. Bruns, 1901. Size 10 × 6½, pp. 48. *Charts.*

Oceanography—Red Sea. **Pott.**

Berichte der Commission für Oceanographische Forschungen. Expedition S. M. Schiff "Pola" in das Rothe Meer. Südliche Hälfte (September 1897—März 1898). Beschreibender Theil, verfasst von Paul Edler von Pott. Wien, 1899. Size 12 × 9½, pp. 54. *Map and Plates.*

Physical Geography. *Science* **14** (1901): 205–210. **Norton.**

The Relation of Physical Geography to other science subjects. By W. H. Norton.

A lucid exposition of the true position of physical geography as a science, the principal aim of which is the study of land-forms.

Physical Geography. **Suess.**

Das Antlitz der Erde. Von Eduard Suess. Dritter Band, Erste Hälfte. Wien, [&c.]: F. Tempsky, 1901. Size 11 × 8, pp. iv. and 508. *Maps and Illustrations. Price 25s. net.*

This will be specially reviewed.

Terrestrial Magnetism. *Terrestrial Magnetism* **6** (1901): 73–75. **Bauer.**
Note on the Secular Motion of the Earth's Mean Magnetic Axis. By L. A. Bauer.

Weather Prediction. *Climat* (1901): 171–180. **Wölffing.**
On the Possibility of Weather Prediction for a Long Time Ahead. By Prof. Dr. E. Wölffing.

Zoogeography. *P. Zoolog. S.* **1** (1901): 372–394. **Jameson.**
On the Identity and Distribution of the Mother-of-Pearl Oysters; with a Revision of the Subgenus *Margaritifera*. By H. Lyster Jameson, B.A., PH.D. *Illustrations.*

BIOGRAPHY.

Orléans. *Questions Dipl. et Colon.* **12** (1901): 231–233. **De la Panouse.**
Henri d'Orléans. Par Colonel de la Panouse.

Smith. **Dickson.**
The life of Major-General Sir Robert Murdoch Smith, K.C.M.G. By his Son-in-Law, William Kirk Dickson. Edinburgh & London: William Blackwood & Sons, 1901. Size 9 × 6, pp. xii. and 376. *Portraits, Maps, and Illustrations. Price* 15*s. net. Presented by the Publishers.*

This life of Sir R. Murdoch Smith presents a very clear view of the many-sided work accomplished by the deceased general during his active life. The principal attention is devoted to his services in the field of archæological exploration and the opening of the great Indo-European telegraph route. The great value of the latter, not only to Europe, but to Persia itself, has long been fully recognized, and lends a special interest to the record of Murdoch Smith's labours towards its accomplishment.

Venukoff. *Deutsche Rundschau G.* **24** (1901): 42–43. **Stenin.**
Generalmajor M. I. Wenjukoff. Von P. v. Stenin. *With Portrait.*

GENERAL.

Comparative Geography. *Riv. G. Italiana* **8** (1901): 481–495. **Porena.**
A proposito di un recente articolo "sulla Geographia comparata secondo il Ritter e il Peschel." Nota del Prof. Filippo Porena.

Education. *G. Teacher* **1** (1901): 10–13. **Bird.**
Limitations and Possibilities of Geographical Teaching in Day Schools. By C. Bird.

Geographical Science. *National G. Mag.* **12** (1901): 324–337. **Genthe.**
German Geographers and German Geography. By Martha Krug Genthe, PH.D.

An account of some of the most famous German geographers from Behaim to Ratzel, and of the modern development of Geographical science. The authoress unhesitatingly classes Mercator as a German, and gives the name of Apianus as Bennewitz (for Bienewitz).

German Colonies. *Beiträge Kolonialpolitik* **3** (1901–1902): 23–32. **Dove.**
Meteorologische Beobachtungen aus den Deutschen Schutzgebieten. Von Prof. Dr. K. Dove.

German Colonies. *Beiträge Kolonialpolitik* **3** (1901–1902): 1–9, 41–50. **Hillemanns.**
Unsere Kolonien im Jahre 1900. Von Dr. Hillemanns.

Malaria. *Questions Dipl. et Colon.* **12** (1901): 333–348. **Dantec.**
Le paludisme, sa prophylaxie. Par Dr. Le Dantec. *With Illustrations.*

Malaria. *Climate* **3** (1901): 12–19. **Macgregor.**
Malaria and its Prevention. By His Excellency Sir William MacGregor, K.C.M.G. *With Illustrations.*

Museum Reports, etc. ——
Report of the Board of Education, 1900–1901. Vol. iii.—Appendix to Report. Reports and Returns (Museums, etc.), Instructions and Minutes. London: Eyre & Spottiswoode, 1901. Size 9½ × 6, pp. vi. and 618. *Price* 2*s.* 6*d.*

Includes, among other reports, that of the Director-General of the Geological Survey for 1900.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

England and Wales. **Ordnance Survey.**

ORDNANCE SURVEY OF ENGLAND AND WALES:—Revised sheets published by the Director-General of the Ordnance Survey, Southampton, from November 1 to 30, 1901.

1-inch:—

Printed in colours: 16 and 17 (combined), 169, 171, 173, 174, 195, 196, 1*s. each*. Towns and surrounding country, with roads printed in colour. Banbury, 1*s.* 3*d.*

6-inch—County Maps:—

Bedfordshire, 7 N.E., 34 S.E. **Derbyshire,** 57 N.E. **Merionethshire,** 5 S.E., 14 S.W. 15 N.W., N.E., 16 S.E., 19 S.W., 26 N.E., S.W., 28 S.W., 29 N.W., N.E. (31 S.E. and 32 S.W.), 32 N.W., 33 S.E., 34 N.E., 35 N.E., 36 N.W., S.E., 37 N.W., S.W., S.E., 38 N.E., S.W., 39 N.W., N.E., 41 S.E., 42 N.W., N.E., 45 S.E. **Monmouthshire,** 18 S.E. **Montgomeryshire,** 3 N.E., 7 N.E., 12 N.E., 18 N.E. **Northamptonshire,** 40 S.E., 41 N.W., 47 N.E. **Staffordshire,** 29 N.E., 31 N.W., 32 S.W., 38 S.E., 39 S.W., S.E., 40 S.W. **Wiltshire,** 49 N.W., 51 S.W., 56 S.E., 57 N.W., S.W., 63 N.E., 64 N.W., 65 S.W., S.E., 66 N.W., 67 N.E., 69 N.W., 71 N.W., S.E., 72 N.W., 73 N.W. 1*s. each.*

25-inch—County Maps:—

Cambridgeshire, V. 10, 11, 12, 14, 15, 16; VI. 9, 13; X. 2, 11, 12, 13; XI. 2, 5, 6, 7, 10, 11, 13, 14, 15; XIV. 2, 4, 8; XV. 1, 2, 3, 5, 6, 9, 10, 13, 14; XX. 1, 2, 5, 7, 10, 11, 14, 15; XXIV. 3, 4, 7, 8; XXXVIII. 13; XLIV. 12; XLV. 1, 2, 7. **Dorsetshire,** III. 8; VIII. 5, 13; XIV. 1; XXIV. 1, 5, 7, 9, 13; XXXIII. 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16; XXXIV. 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16; XXXV. 8, 10, 11, 12; XLIII. 1, 2, 3, 5, 6, 7, 10, 11, 12, 13, 14, 15; L. 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14; LI. 1, 6, 10. **Gloucestershire,** I. 11, 15; II. 9, 10, 11. **Huntingdonshire,** III. 13; V. 4; VII. 9, 13, 14; XI. 1, 2, 5, 9, 10, 13, 14, 15; XV. 1, 2, 3, 4, 5, 7, 8, 9, 13; XIX. 1, 2, 5, 6 9, 10, 13; XXVI. 13; XXVII. 12; XXVIII. 1, 2, 7. **Monmouthshire,** XXX. 1, 14, 16; XXXI. 5; XXXV. 2, 4, 5, 6, 9; XXXVIII. 2, 6. **Montgomeryshire,** X. 16; XI. 11; XXV. 16; XXVI. 12, 13, 14, 15, 16; XXVII. 1, 2, 5, 6, 7, 10, 12, 14, 15; XXVIII. 3, 7, 9, 11; XXXIII. 3, 4, 7, 10; XXXIV. 2, 3, 6, 7. **Shropshire,** XIV. 13, 14, 15, 16; XX. 3, 4, 6, 7; XXI. 4, 9, 10, 13; XXVI. 11; XXVIII. 9, 11. **Staffordshire,** XXXVII. 11; XLIV. 4, 8; XLVII. 5, 6, 9, 13; LIII. 6, 7, 11, 16. 3*s. each.*

4 miles to 1 inch:—

County maps, with roads printed in colour. Isle of Man, 9*d.*

Miscellaneous Maps.

6-inch scale. Bermuda, special map of, in six sheets. 2*s. each.*

(*E. Stanford, London Agent.*)

France. **Thoulet.**

Carte Lithologique sous marine des Côtes de France. Par M. Thoulet. Paris: A Challamel. 10 sheets. *Presented by the Author.*

Sheets 8 to 17 of Prof. Thoulet's lithologic charts of the coasts of France, which have just been presented to the Society, show the whole of the western coast from the Channel Islands to the neighbourhood of Arcachon, with the character of the submarine rocks, for distances varying from 30 to 50 miles from the shore. As in the case of those previously published, Prof. Thoulet has based his charts, so far as outline and soundings are concerned, upon those of the "Service Hydrographique de la Marine." A vast amount of information with reference to the rocks and rock formations is given by means of different colours and symbols. Contour lines at intervals of 10, 50, and 100 metres are shown, and numerous soundings are given in figures.

Germany. **Krauss.**

Radfahrer-Uebersichtskarte von Deutschland und den benachbarten Ländern, herausgegeben vom Deutschen Radfahrer-Bunde. Bearbeitet von P. Krauss. Scale 1 : 850,000 or 11·8 stat. miles to an inch. Sheets 1, 3, 5. Bibliographisches Institut, Leipzig.

The first three sheets of a six-sheet road map of Germany and portions of the surrounding countries, specially useful to cyclists and tourists.

Liverpool. **Bartholomew.**

Plan of Liverpool. Scale: 300 yards to an inch. By J. Bartholomew, F.R.G.S. London: W. H. Smith & Sons. New edition. *Price* 2*s*. *Presented by Messrs. J. Bartholomew & Co.*

ASIA.

Afghanistan, Persia, India, etc. **Langhans.**

Politisch-militärische Karte von Afghanistan, Persia, und Vorder-Indien, zur Veranschaulichung des Vordringens der Russen und Engländer. Scale 1: 7,500,000 or 118 stat. miles to an inch.—Afghanistan und Russisch-Englische Grenzgebiete. Scale 1: 4,000,000 or 63 stat. miles to an inch. With insets. Von Paul Langhans. Gotha: Justus Perthes, 1901. *Price* 1 *mark.*

This map has been specially prepared to illustrate the advance of England and Russia in Central Asia. It shows all railways and telegraph lines, principal trade routes, including the new British Quetta-Kerman route from India to Persia. Much information by various symbols concerning the location and strength of British and Russian military forces on the Indian and Russian frontier is also given, and the map for general reference will doubtless be useful. The famine-stricken districts of India in 1865 and 1900 are indicated by tinting. An inset is given on an enlarged scale of the Punjab, northern Baluchistan, Afghanistan, and the adjoining regions of Russian Central Asia, but there is upon it no indication of the new Indian North-West Frontier Province. There are two other insets; one of Asia on a small scale, showing the increase of British and Russian power, with the dates in red, when certain territories were acquired by the respective countries; and another of south-west Germany, on the same scale as the principal map, for comparison of areas. Statistical information of a military nature is given on the cover. The map is based upon sheets of Stieler's Hand-Atlas.

Annam. **Service Géographique de l'Indo-Chine.**

Carte de l'Annam. Scale 1: 100,000 or 1·6 stat. miles to an inch. Sheets: "Ha-Dong," "Tourane," "Hué," "Poulo-Canton," "Quang-Ngai," "Phu-Gia," "Phu-My," "Bong-Son," "Phu-Yen," "Qui-Nhon." Service Géographique de l'Indo-Chine, 1900. *Price of each sheet*, $0.60.

These sheets form part of a large-scale map of Annam, now in course of publication. It is printed in colours; the hills are shown by a system of brown horizontal lines having the appearance of true contours, but there is a note in the corner of each sheet, explaining that they must not be mistaken for such. Roads are in red, and water blue.

Asia Minor. **Diest.**

Karte des nordwestlichen Kleinasien in vier Blättern, nach eigenen Aufnahmen und unveröffentlichtem Material auf Heinrich Kiepert's Grundlage neu bearbeitet von Walther v. Diest. Scale 1: 500,000 or 7·8 stat. miles to an inch. Sheet C. Salichli. Berlin: Alfred Schall.

When completed, this map will consist altogether of four sheets. It has been compiled by Major W. v. Diest, from recent surveys and unpublished materials, based upon Dr. H. Kiepert's well-known map of Western Asia Minor upon the same scale. An account was given of the author's own surveys, accompanied by maps, in *Petermanns Geographische Mitteilungen* for 1898. Hill work is shown by brown shading, and the low-lying districts are tinted green. Ancient names of towns are given in many instances, in addition to the modern names. Heights are given in metres.

Asiatic Russia. **Ministry of Ways and Communications.**

Map of Asiatic Russia. Scale 1: 4,200,000 or 66·3 stat. miles to an inch. St. Petersburg: Ministry of Ways and Communications, 1901. Russian character. 3 sheets.

This map is specially interesting, inasmuch as it shows the condition of Russian railways in Central Asia up to a few months ago, when it was published. Both the Trans-Siberian and Trans-Caspian systems, with their proposed branches and connections, are clearly laid down. It includes the region from the Caspian to the Pacific coast, and the northern frontier of India to Tobolsk. In addition to railways, both constructed and proposed, the map shows roads, telegraphs, and other useful information.

Indo-China. **Bureau Topographique des Troupes de l'Indo-Chine.**

Carte de l'Indo-Chine. Scale 1 : 500,000 or 7·8 stat. miles to an inch. Sheets: "Vien Tiane," "Qui Nhon," "Nha Trang," "Quang-Tcheou," "Lieng Shui," "Laokay," "Korat," "Khong," "Bang Kok," "Pak Nam," "Vinh Long," "Saigon," "Ou Tcheou," "Tourane," "Hué," "Vinh." Bureau Topographique des Troupes de l'Indo-Chine. *Price of each sheet*, $0·60.

These sheets form part of a map of Indo-China, which is to embrace the whole region from Tongking to Cochin China, and to include portions of the adjacent territories. It is evidently reduced from the larger-scale map (1 : 200,000), but the style of work is decidedly rough.

Manchuria. **Borodovsky.**

Map of Manchuria. Scale 1 : 3,300,000 or 45·2 stat. miles to an inch. By S. C. Borodovsky. St. Petersburg: V. Kershbauma, 1901. With an index. Russian character. *Presented by the Author.*

An earlier edition of this map was noticed in the *Geographical Journal* for December, 1897. It has been revised, and is now accompanied by a pamphlet giving an explanatory note on the map, a list of books and maps on Manchuria published since 1896, which have been consulted and utilized in the revision, and finally a good index of place-names.

The map is printed in colours, and shows political boundaries, railways proposed and constructed, telegraphs, roads, location of minerals, relative importance of towns, and other details of a similar nature, whilst altitudes are given in feet. An inset of the neighbourhood of Port Arthur is given on an enlarged scale, as well as plans of five of the principal towns.

Yunnan. **Bureau Topographique des Troupes de l'Indo-Chine.**

Yun-Nan, Frontières nord-ouest de l'Indo-Chine. Scale 1 : 1,000,000 or 15·8 stat. miles to an inch. Bureau Topographique des Troupes de l'Indo-Chine. 2 sheets. *Price* $0·60.

This map of Yunnan includes also considerable portions of the adjacent territories, extending from Mandalay on the west to Hanoi on the east, and from the latter place on the south to Suifu, in Sechuan, on the north. It is a rough production, printed in colours, and the feeble attempt to represent the relief by shading is certainly not satisfactory. A fair amount of detailed information is given along the routes traversed, but the map might have been more complete if care had been taken to make use of all the available material furnished by travellers. For instance, so long ago as 1898 there was a report published, with a map, of an important journey by Mr. F. S. A. Bourne, containing fresh information and many altitudes, which the compiler seems to have overlooked, or failed to utilize as he could have done.

AFRICA.

Tunis. **Service Géographique de l'Armée, Paris.**

Tunisie. Scale 1 : 100,000 or 1·6 stat. miles to an inch. Sheet lvii, Sfax. Service Géographique de l'Armée, Paris. *Price* 1.20 *f.*

West Africa. **The Chartographic Company, London.**

Map of the West African Gold Mines. Scale 1 : 157,408 or 2·8 stat. miles to an inch. London: The Chartographic Company, 1901. 4 sheets. *Price* £2 2*s*. *Presented by the Chartographic Co.*

Another of the many maps of the Gold Coast and adjacent territories, produced for the special purpose of showing mining claims and limits of concessions, which in the present case are shown in red. Roads are given in brown, and water blue. It is an outline map only, ruled in squares of one minute of latitude and longitude each, evidently to facilitate the addition of fresh information, or the limits of other concessions.

AMERICA.

Argentine Republic. **Buenos Aires and Pacific Railway Co.**

Map of the Argentine Railways. Scale 1 : 2,534,400 or 40 stat. miles to an inch. Buenos Aires and Pacific Railway Co., Buenos Aires and London, 1901. *Presented by the Publishers.*

A new edition, showing railways constructed and proposed.

Brazil. **Jannasch.**

Karte von Südbrasilien. Rio Grande do Sul, Santa Catharina, Paraná, nebst den

Grenzländern. Scale 1:2,000,000 or 31·6 stat. miles to an inch. Von Dr. R. Jannasch. Berlin: Leopold Kraatz, 1902.

GENERAL.

German Colonies. **Sprigade and Moise**

Grosser Deutscher Kolonialatlas. Bearbeitet von Paul Sprigade und Max Moisel. Herausgegeben von der Kolonial-Abtheilung des Auswärtigen Amts. Lieferung 1, Kamerun in 6 blättern. Scale 1:1,000,000 or 15·8 stat. miles to an inch. Berlin: Dietrich Reimer (Ernst Vohsen), 1901. *Presented by the Publisher.*

In consequence of many recent explorations and surveys, the German Colonial Office has decided to publish a new atlas of the German colonies, with maps on a larger scale than most of those that have hitherto existed. The first part, above mentioned, has just been received. The maps will be prepared under the supervision of Messrs. Sprigade and Max Moisel at the well-known cartographical institute of Dietrich Reimer (Ernst Vohsen), Berlin, and will, with few exceptions, be all drawn upon the scale of 1:1,000,000. They are to be printed in colours, and great care will be taken to make use of the best available material. Judging from this first part, which includes the Kamerun region, in six sheets, the atlas promises to be a most excellent and valuable production. It will consist altogether of thirty sheets of maps, and will be accompanied by letterpress.

World. **Johnston.**

The Victoria Regina Atlas. Physical, Political, and Astronomical, containing 200 plates and complete index. 2nd edition. W. & A. K. Johnston, Edinburgh & London, 1901. *Presented by the Publishers. Price from £1 1s. to £2 5s. according to binding.*

This is the second edition of an atlas which first appeared about four years ago. No new maps have been added, and, although an attempt has been made to bring it up to date in some instances, there is still much that needs attention. For instance, the rainfall map of the world, No. 23, remains just as it appeared in the first edition, notwithstanding the fact that much important information has been obtained since then, and Dr. A. J. Herbertson's valuable work, with maps, has been published by this Society, which, however, the publishers seem to have ignored. The topographical features on some of the maps are very much out of date, as in the case of Abyssinia, where it is clear that little or no use has been made of the work of recent explorers in the southern part of the country. On map No. 112, the Sudan railway is only shown as far as Shendi, instead of to Khartum. Then, again, some of the maps of South America are very much behindhand. Important maps that have appeared from time to time in the *Geographical Journal*, and which might have been made use of, have apparently been overlooked, whilst the railways in South America are also in several cases out of date. The northern boundary of Paraguay, as shown on map No. 189, is entirely different from that given on map No. 197.

However, there are some improvements upon the earlier edition, and in several cases it is apparent that the maps have been more or less revised. The idea of utilizing the general maps of England, Scotland, and Ireland as indices for the more detailed maps of the counties, by ruling and numbering upon them the sheets of the larger-scale maps, is certainly a good one. The style in which the maps have been produced cannot be considered satisfactory; the hill-work and other physical features are often very confused and indistinct, and the lettering in many cases is so small as to be almost illegible, owing, apparently, to the process of reduction from maps of larger scales.

World. **Stieler.**

Neue, neunte Lieferungs-Ausgabe von Stielers Hand-Atlas, 100 Karten in Kupferstich. 1 Lieferung. Gotha: Justus Perthes, 1901. *Price of complete atlas, in 50 parts, will be 30 marks, or 60 pg. per part. Presented by the Publisher.*

The last edition of Stieler's Hand-Atlas was completed just ten years ago, and since that time exploration and geography generally has made much progress. Regions that then had to be represented by blank spaces have now been explored, and districts that were at that time but comparatively little known have been carefully mapped, in addition to which many alterations have taken place in boundary-lines, especially of the territorial possessions of European countries. All this has rendered it most desirable that a new edition of this well-known and excellent atlas should appear, which it is gratifying to know the publishers have taken in hand, and of which they have now issued the first part. According to the prospectus, this new edition, the ninth that has been published, will contain altogether one hundred maps, being five more than were given in the last edition. Of these, forty-nine are quite new or have been entirely redrawn, while pains have been taken to bring the others up to date.

Several of the maps in the previous edition have been cancelled, and many are to be superseded by new ones, generally drawn on enlarged scales. Among the more important of the new maps is one of Siberia, in 2 sheets, on the scale of 1 : 7,500,000; China, 1 : 7,500,000; Africa, on 6 sheets, 1 : 7,500,000, which is to supersede the previous map on the scale of 1 : 10,000,000; Australia, in 4 sheets, 1 : 5,000,000; a map of Eastern Canada, 1 : 7,500,000, to supplement the map of West Canada and British Columbia, previously given on the same scale. These maps will add considerably to the value of the atlas, and some of them were very much needed. The whole atlas is to appear in fifty parts, each containing two maps, in addition to which there will be a full alphabetical index to place-names. It is the intention of the publishers to issue one part every two or three weeks.

Instead of the hill-work being in black hachuring as hitherto, it is now shown in brown, which ought to be an improvement, inasmuch as the names, printed in black, should be more legible; but in the map of China, which appears in this part, the result cannot be considered altogether satisfactory. This is one of the new maps, and certainly gives a vast amount of information for a map on so small a scale: it is, however, somewhat overcrowded, and from one reason and another decidedly lacking in clearness, especially in the western portion.

On the back of each map is a small index, squared in to show the area included in the map itself, as well as those embracing the adjacent regions, with their numbers.

The most important alteration of all is in the price, for the complete atlas is to cost only 30 marks, which is less than half the price of the previous edition.

It is, however, to be hoped that this reduction in price does not mean a lowering of the standard of excellence in the execution of the maps, which has hitherto characterized this well-known atlas.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, September and October, 1901. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
3227 to 3238		Monthly wind charts for coasts of South America. 6*d.*
3192	m = 6·0	Scotland, west coast:—Loch Broom (upper portion). 2*s.* 6*d.*
3104	m = 1·4	England, east coast:—Hartlepool to Blyth. 2*s.* 6*d.*
3212	m = 7·0	Ports on the east coast of Italy:—Port of Ancona. 1*s.* 6*d.*
3197	m = 1·8 / 3·6	Cuba:—Mevitas bay. Entrance channel. 2*s.* 6*d.*
3213	m = 3·0	Plans on the north coast of Brazil:—Port Timonha, Port Camocim. 1*s.* 6*d.*
1921	m = 6·0 / 1·0	Plans in the Indian ocean:—St. Paul island, Amsterdam island. 2*s.*
3214	m = 1·0	Red sea. Suez bay:—Ports Ibrahim and Thewfik. 1*s.* 6*d.*
1143	m = 7·4 / 5·6	Anchorages in Malacca strait:—Wanderer bay, Arang Arang anchorage (republication). 1*s.*
3209	var.	Bays and anchorages in Makassar strait. 1*s.* 6*d.*
1578	m = 4·0	Japan:—Simonoseki strait. 2*s.* 6*d.*
3196	var.	Harbours and anchorages on the west coast of Nipon, Japan. 1*s.* 6*d.*
3200	m = 0·35	Japan:—Aikappu Misaki to Rebun islands. (Plans:—Kabuka Biochi, Oniwaki Biochi, Teshio Gawa-Gashi.) 2*s.* 6*d.*
3198	m = 0·9	Russian Tartary:—Askold island to Cape Povorotni. 2*s.* 6*d.*
3222	m = 3·0	Russian Tartary:—Rikorda island to Larionoff point. 2*s.* 6*d.*
1062	m = 0·25	Australia, south coast:—Rivoli bay to Cape Otway. 2*s.* 6*d.*
1014	m = 0·25	Australia, south coast:—Cape Jervis to Rivoli bay. 2*s.* 6*d.*
1383	var.	Islands and anchorages in the south-east Pacific ocean:—Juan Fernandez, Cumberland bay, Mas a Fuera island, St. Felix and St. Ambrose islands, St. Felix road (republication). 1*s.* 6*d.*
2194		Anchorages in the northern part of Celebes. New plans:—Bolang Uki bay, Sumalata road, Himana bay, Pienchang bay, Domisil bay, Paleli and Lintidu roads.
208		Japan:—Harbours and anchorages on east coast Nipon. New plan:—Uchiura Wan.

(*J. D. Potter, Agent.*)

Charts Cancelled.

No.		Cancelled by	No.
200	Plan of Ancona on this chart.	New plan. Port of Ancona	3212
411	Plans of Puerto de las Nuevitas del Principe on this chart.	New plan. Neuvitas bay	3197
1921	St. Paul island.	New sheet. Plans in the Indian ocean	1921
1945	Amsterdam island.		
1143	Anchorages in Malacca strait.	New sheet. Anchorages in Malacca strait	1143
2194	Plan of Kaidipan and Bolang Itam anchorages on this sheet.		
2662	Plans of Wani bay, Membora road, Palos road, Dangola road, and Mamuju bay on this sheet.	New sheet with these plans	3209
3003	Plans of Tobi shima anchorage and Kamo harbour on this sheet.	New sheet with these plans	3196
2432	Plan of Nayezduik bay on this sheet.	New chart	3198
1117	Plan of Abrek bay on this sheet.		
1062	Glenelg river to Cape Otway.	New chart. Rivoli bay to cape Otway	1062
1014	Cape Jervis to Guichen bay.	New chart. Cape Jervis to Rivoli bay	1014
1015	Guichen bay to Glenelg river.		
1383	Jan Fernandez. Mas a Fuera island.	Islands and anchorages in the south-east Pacific ocean	1383
1344	Cumberland bay.		
1276	St. Felix and St. Ambrose islands, plans on this sheet.		
2432	Plan of anchorages on the west coast of Kazakavitch island, on this chart.	New chart	3222

Charts that have received Important Corrections.

No. 1185, England, east coast:—River Thames, sea reach. 60, Channel islands:—Alderney and the Casquets. 117, Fœroe islands. 2296, Gulf of Bothnia:—South Quarken to Hornslandet. 2302, Gulf of Bothnia:—Tome point to Tauvö. 33, Germany:—Kiel Fiord. 2206, Black sea:—Odessa bay. 2220, Ports on the south shore of the Black sea. 2216, Turkish ports on the south shore of the Black sea. 282, Newfoundland:—St. John bay to Orange bay. 1144, Magdalen islands:—Grand Entry harbour. 2029, Prince Edward island:—Cardigan bay. 519, Lake Huron. 334, Lake Huron:—Strait of Mackinac. 2522, South America, east coast:—Santa Catharina island to Rio de la Plata. 2887, United States, west coast:—San Pablo and Suisun bays. 592, British Columbia:—Barkley sound. 2462, Alaska:—Windham bay to Icy cape. 713, Mauritius:—Port Louis. 833, Bay of Bengal:—Rangoon river and approaches. 1009, Malacca strait:—Approaches to Perak river. 2201, Plans in Sumatra. 1153, Celebes:—Pulo Mutivo to Tanjong Sutuno. 931, Philippine islands:—Ports Subie and Silanguin. 2734, China, south coast:—Si Kiang or West river, Sheet 2. 1570, Korea:—Approaches to Chemulpho. 104, Korean archipelago, southern portion. 2877, Japan:—Uwajuna bay. 1055, Australia, west coast:—Bedont island to Cape Cuvier. 2747 A and B, Australia, south coast:—Entrance to Port Philip, 2 sheets. 105, Tasmania:—Port Hobart. 2922, Australia, east coast:—Turtle group

to Claremont point. 2532, New Zealand:—Ninety Miles head to Otago. 1417, South Pacific:—Chatham islands.
(*J. D. Potter, Agent.*)

North Atlantic Ocean and Mediterranean Sea. **Meteorological Office, London.**

Monthly Pilot Chart of the North Atlantic Ocean and Mediterranean Sea for December, 1901. Meteorological Office, London. Price 6*d*. *Presented by the Meteorological Office.*

United States Charts. **United States Hydrographic Office.**

Pilot Chart of the North Pacific Ocean for December, 1901. U.S. Hydrographic Office, Washington, D.C. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Baffinland. **Bell.**

Fifteen Photographs of Baffinland by Dr. R. Bell, F.R.S., 1897. *Presented by Dr. R. Bell.*

These photographs are of different sizes and vary considerably in merit; some of them are, however, very good. They were taken during a journey of exploration in Baffinland by Dr. Robert Bell in 1897, an account of which was given in the *Geographical Journal* for July last. The titles are as follows:—

(1) Esquimaux kyaking near Amadjuak fiord; (2) Typical view on south coast of Baffinland; (3) Looking up Cañon inlet; (4) Head of northern inlet of North Bay; (5) Typical view across country in southern Baffinland; (6) Bouldery valley; (7) View across Tussi-mi-la-roong lake; (8) Kyakers passing Amadjuak bay; (9) View of Tussi-mi-la-roong lake; (10) Small glacier; (11) Knob at outlet of Cross lake; (12) Typical summer day; (13) Big island from the south; (14) Kyakers approaching; (15) Esquimaux women in Oomiak.

Canada. **Bell.**

Twenty-four Photographs of the Great Bear lake region, by J. Macintosh Bell, Esq., M.A. *Presented by J. Macintosh Bell, Esq.*

The journey of Mr. J. Macintosh Bell last year, during which these photographs were taken, was described in the *Geographical Journal* for September last. The subjects are well selected, and some of the views will be specially interesting to geologists and students of physical geography, as, for example, those showing the old shores of Great Bear lake, glacial erratics, the Tundra country, south of Coronation gulf, and several others. The following is a list of the titles:—

(1) Glacial erratics, Cape MacDonnell; (2) Northern natives; (3) French half-breed native in the Mackenzie river region; (4) Freetraders' establishment, Fort Resolution; (5) Dog-teams on the Mackenzie river; (6) Old shore-lines (terraces), north shore of MacTavish bay; (7) White spruce trees at old Fort Confidence; (8) Chute des Canards, Camsell river; (9) Old shores of Great Bear lake, Cape MacDonnell; (10) Sand barrens and trees excavated out of the sand by the wind, east shore, Russel bay; (11) Itkan lake, Barren Lands, south of Coronation gulf; (12) Greenstone cliffs, east shore of MacTavish bay; (13) Wind-excavated trees, east shore of Russel bay; (14) Christianized Indian children, Fort Providence; (15) Hudson Bay Co.'s post at Fort Simpson; (16) Indian children, Fort Providence; (17) Old Fort Confidence, north-east end of Great Bear lake; (18) White Eagle falls, Camsell river; (19) Tundra country, south of Coronation gulf; (20) Dogrib Indian camp, near Dawaso-necha lake; (21) Dawaso-necha lake; (22) Trees and quartzite talus slopes, near Fort Confidence; (23) Drumlins (glacial mounds), Barren Lands, south of Coronation gulf; (24) Trees covered with sand, by wind, east shore, Russel bay.

Central Africa. **Weatherley.**

Forty-five Photographs of British Central Africa, by Poulett Weatherley, Esq., 1898. *Presented by P. Weatherley, Esq.*

The Society is already indebted to Mr. Poulett Weatherley for many excellent photographs of the Lake Mweru and Bangweulu region of Central Africa, and these form a welcome addition to those he has already presented. Many of them are extremely good.

(1) The Luapula, near its entrance into Bangweulu; (2) The native who ferried Livingstone across the Lulimala, the last day of Livingstone's life; (3) Mumbotuta

from my camp; (4) Vavemba women (showing tattooing on bodies) wearing bark cloth; (5) A celebrated hunter to the south of Lake Mweru; (6) Headquarter camp from Kasoma's boma, Lake Bangweulu; (7) Mumbotuta; (8) Mumbotuta from the rocks, 50 feet below my camp; (9) Kalongwa point from my camp, Lake Bangweulu; (10) The coiffure of a native of Kirui; (11) Coiffure of a Mwa Usi; (12 and 13) Coiffure of a woman of Urua, north-west of Lake Mweru; (14) Digging for water *en route* to Chitambo from Kafufwe; (15) Luapula river, near the Luombwa; (16) The Luapula about 1½ mile to the north of the Johnston falls; (17) The Luapula opposite Chinama's; (18) First crossing-place on the Luombwa; (19) Luanga, West Mweru; (20) Native of Kisi—a freak of nature; (21) The Luapula, halfway between the Johnston falls and Mweru; (22) Coiffures of natives on the upper Luapula; (23) View from the new station at Chienjé, looking towards Kampingi; (24) Part of the Johnston falls; (25) Decayed portion of the mupundu tree, with the Livingstone inscription, Chitambo; (26, 27, and 28) Parts of Mambilund, Johnston falls, showing conglomerate rocks; (29) View from Ihota hill, looking north up the east shore of Fungé peninsula, west coast, Lake Bangweulu; (30) *Vigilant*, self, and crew at Ihota point, after the circumnavigation of Lake Bangweulu; (31) View from Mwana ngipe's boma, on the west shore of Lake Kampolombo; (32) View of coast and lower plateau of Buhongolo range, looking north; (33) Mupundu tree at its maturity in summer foliage; (34) Part of the Great Uchinda marsh, south-west Lake Bangweulu; (35) Mumbotuta from Mr. Weatherley's camp; (36) Mr. Weatherley's porters leaving Kalonga's; (37) Mwa Usi's coiffure; (38) Kawandé musi in the extreme distance, and part of the Great Kavangama marsh; (39) The mupundu tree under which Livingstone's heart was buried: on the forked mutowo tree in the background (not the visitor's tree) the body of Livingstone was placed to dry in the sun during the process of embalming; (40) Livingstone inscription on the mupundu tree; (41) The mupundu, from the left bank of the Luwé river; (42) Luwé river, looking up, a little above the mupundu tree; (43) Giraud's boat: the centre section was broken up by the Wa Usi for making bullets, etc.; (44) View of Chifunawuli; (45) A Mwina Kisinga and Mwina Katanga.

Kentucky. **Semple.**

Twelve Photographs of Kentucky, by Miss Semple. *Presented by Miss Semple.*

Most of these photographs were reproduced in the *Geographical Journal* for June last, to illustrate Miss Semple's paper on "The Anglo-Saxons of the Kentucky Mountains." They are as follows:—

(1) Mountain types; (2) A mountain saw-mill; (3) Hand-loom and spinning-wheel for flax; (4) Hand-mill for grinding maize; (5) Saltworks in Clay country; (6) Landscape in a marginal country; (7) A bit of level land; (8) A mountain church; (9) Cabin of the better sort; (10) Corn-mill in an upland "cove;" (11) An "upright" farm; (12) Fording a stream.

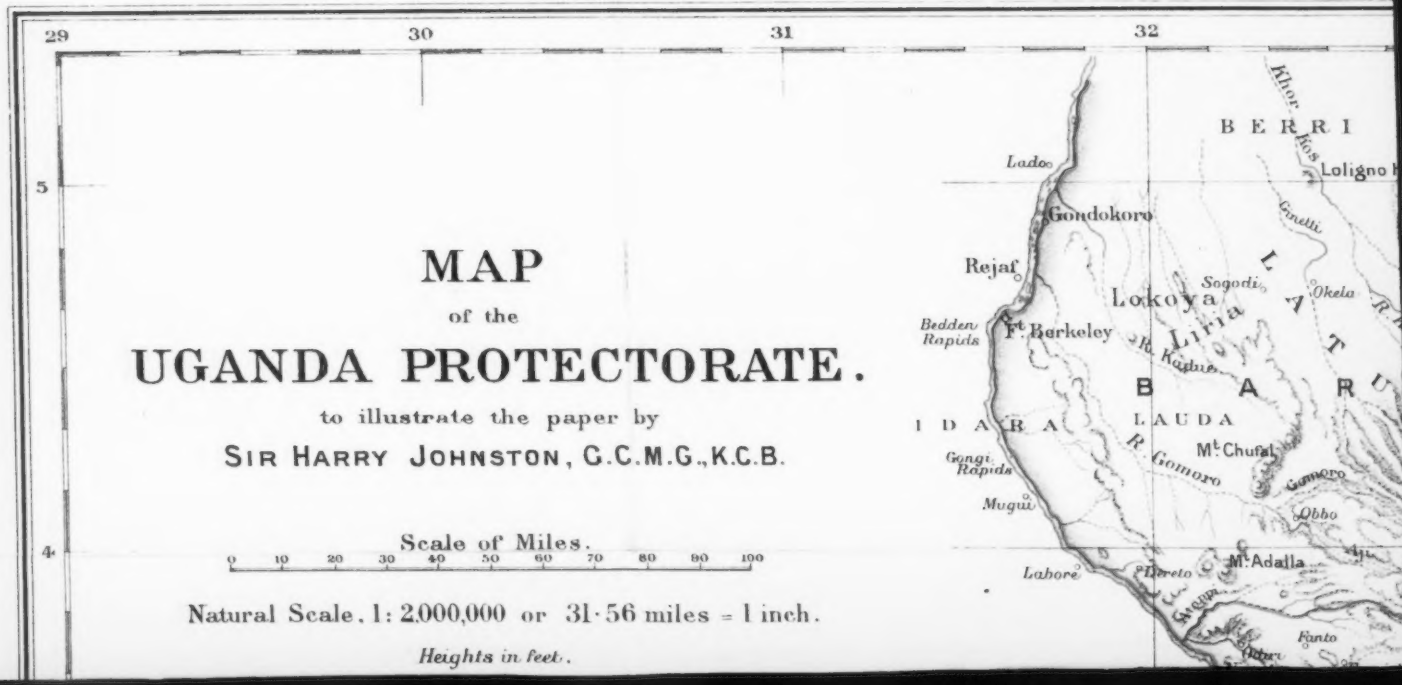
Rhodesia. **Grey.**

Fifty-one Photographs of Northern Rhodesia, in the neighbourhood of the Kafue river, by G. Grey, Esq., 1899. *Presented by G. Grey, Esq.*

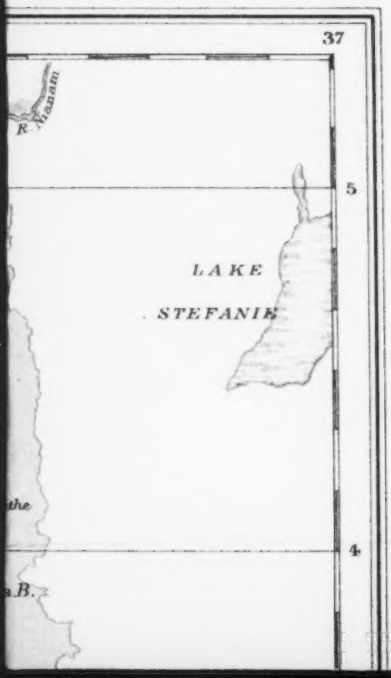
The region through which Mr. G. Grey travelled in 1899, when he took these photographs, lies to the north of the Zambezi, in the neighbourhood of the Victoria falls, to about 11° 30′ S. lat., and includes the Kafue river and its tributaries. The views are principally representative of the scenery and incidents of travel.

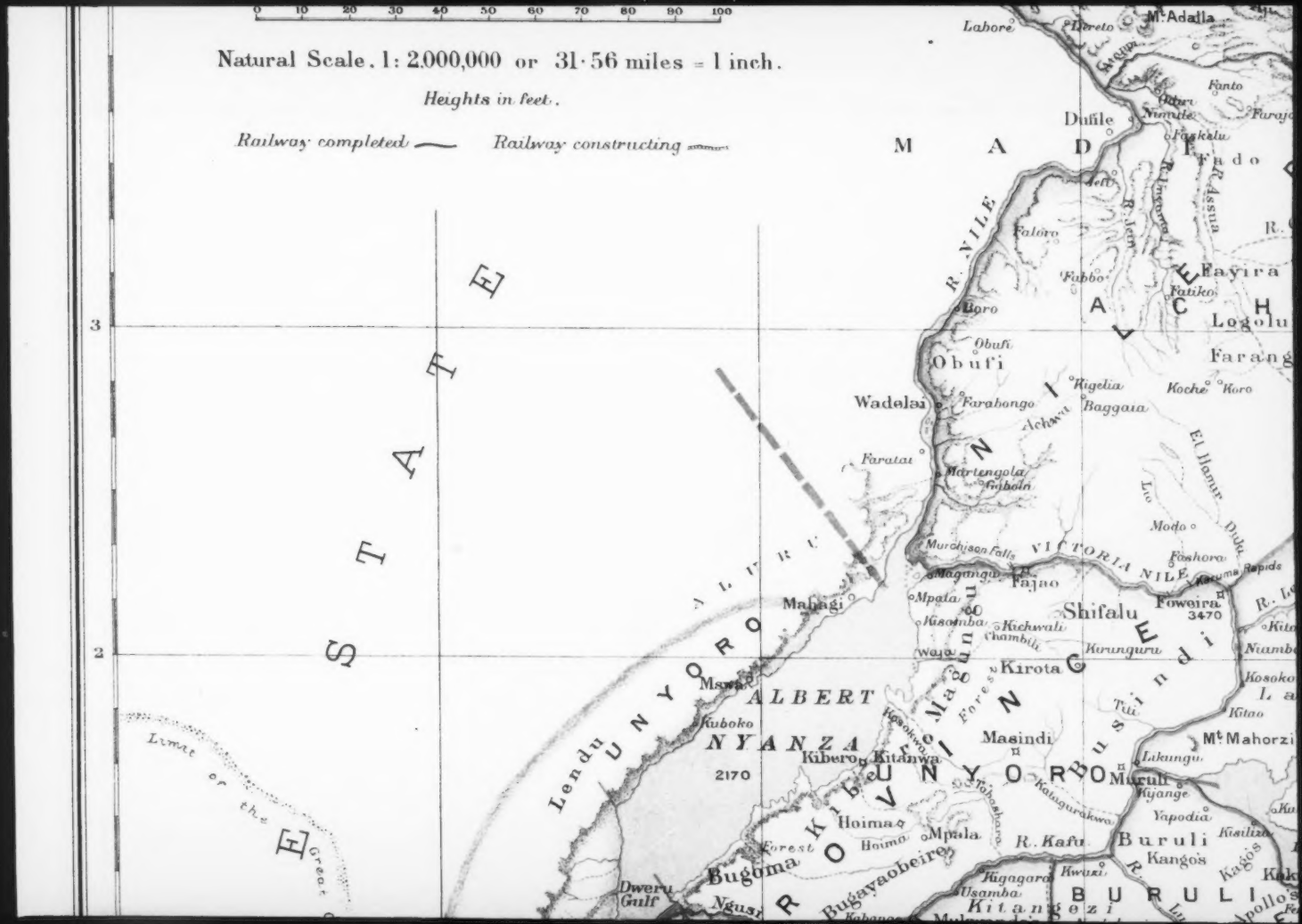
(1) On the Zambezi river, near Binga's kraal; (2, 3, and 4) Taking donkeys across a river; (5) Travelling companions; (6) Camp scene—the kitchen; (7) Packing up, on the banks of the Zambezi; (8) Corn crop on the Matoka plateau; (9) Boy lighting fire; (10) Lion-proof kraal; (11) Nogolo river, near its junction with the Zambezi; (12) On road from Buluwayo to Lubu; (13) Mr. M. G. Farquhar; (14) Pack-mule; (15) Mr. G. Grey; (16) Mule rolling with pack; (17) Boy riding mule; (18) Donkey-waggons on road between Zambezi and Lubu; (19) Camp at Lubu; (20) Mopani veldt on the Lubu; (21) Mr. N. C. Gielgud, native commissioner, Lubu; (22) Mr Gielgud's waiter; (23) Mr. Gielgud and his boat; (24) German-sausage tree; (25–51) No titles.

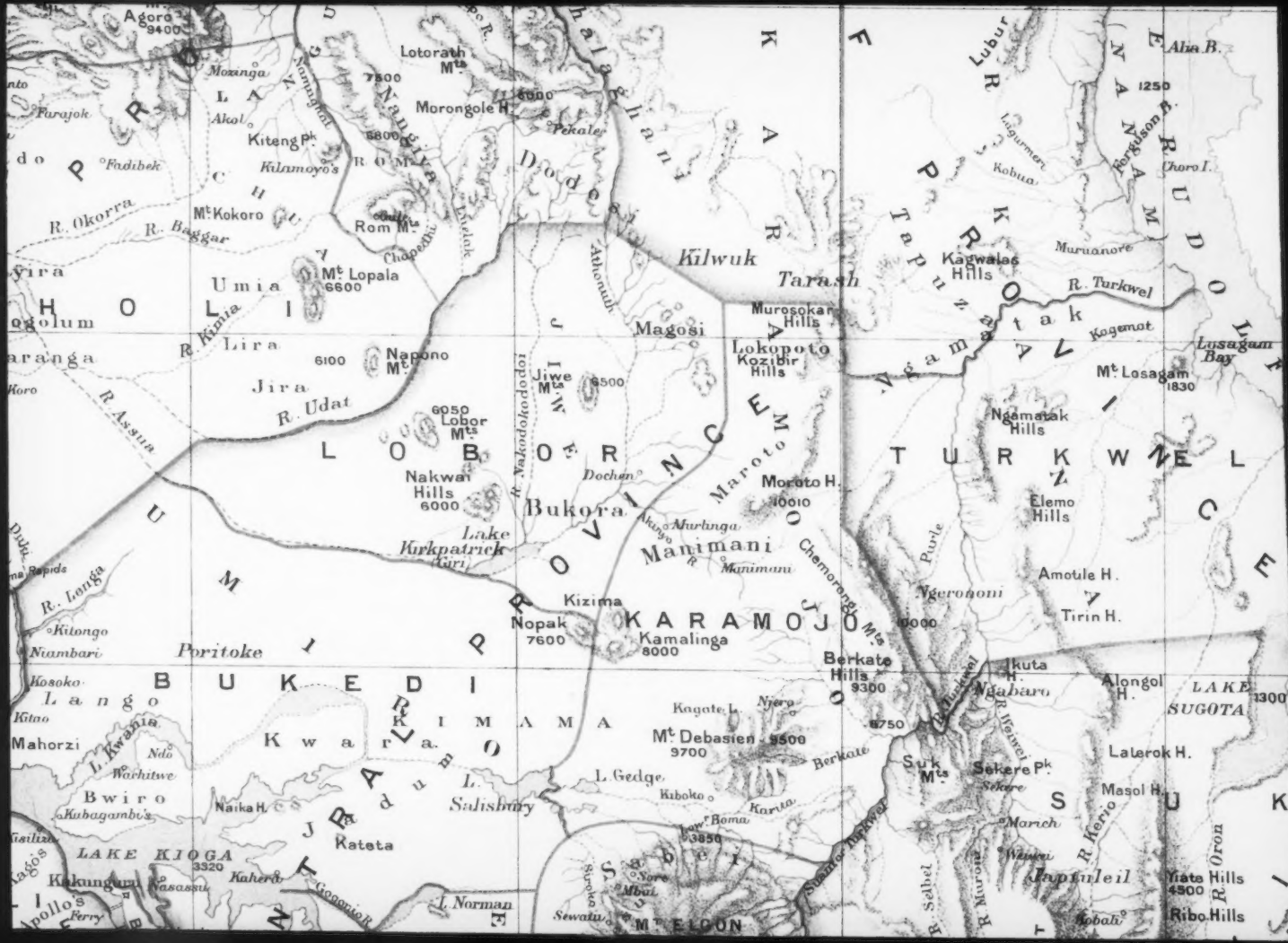
N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

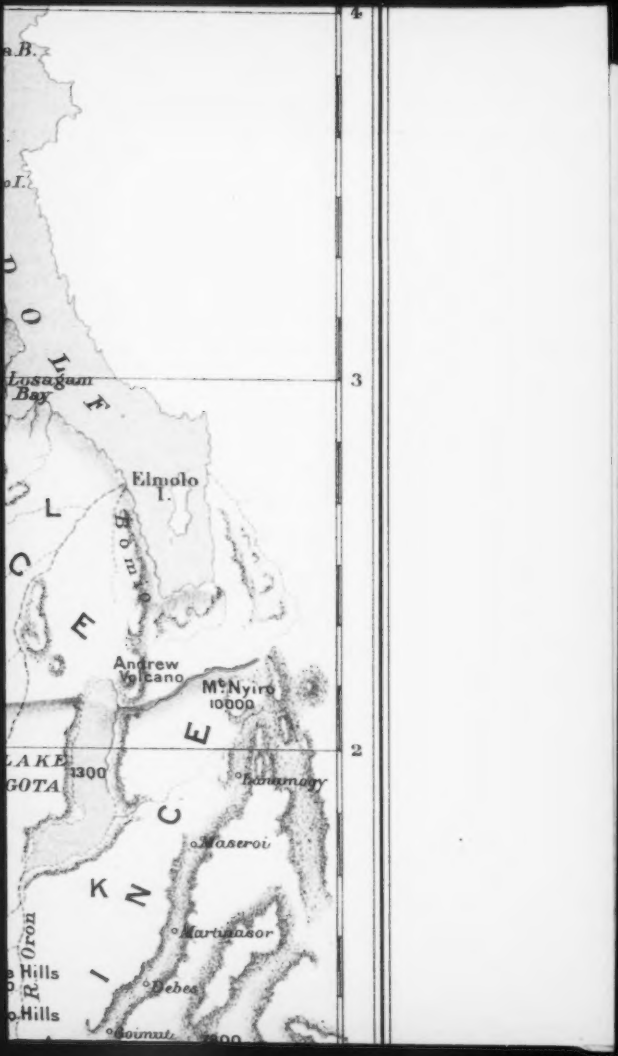

29
30
31
32
5
4
MAP
of the
UGANDA PROTECTORATE.
to illustrate the paper by
SIR HARRY JOHNSTON, G.C.M.G., K.C.B.
Scale of Miles.
0 10 20 30 40 50 60 70 80 90 100
Natural Scale, 1: 2,000,000 or 31·56 miles = 1 inch.
Heights in feet.
BERRI
Khor Kos
Lado
Loligno
Gondokoro
Ginetti
Rejaf
Sogodi
Okela
Lokoya
Liria
Bedden Rapids
Ft. Berkeley
R. Kibbie
B A R
LAUDA
Mt. Chufal
R. Gomoro
Gomoro
Gongi Rapids
Mugui
Obbo
Mt. Adalla
Labore
Fanto

33
34
35
36
R. Oguelokur
Musingok
Tamarata
Tamarata
DONYIRO
Muska
Koras H.
R. Mountain
R. Nanam
Nakua
Amite
Nongolibe
Sunderson Gulf
Lorusia Mts
5800
Lumian
Komogai
Modo Hills
4030
Mt. Lubur
4250
5335
Loligno H.
R. Tu
Mt. Lafit
Okela
R. Kos
Mt. Odiodok
Mt. Odio
5000
Baja Pk
5000
Tarangole
Loguren
TURKANA
Mt. Tirano
R. Ruzi
RUDOLF
DODINGA
Rogo
Harogo Mt
8800
Lotoke Mts
DABOSSA
Khalapei
Mt. Egadang
Narao
Kidepo R.
Abo
Mt. Agoro
9400
Mozanga
Lotorath Mts
7500
Morongole H.
5000
Lubur Mts
Lubur R.
Moranaithe I.
LAKE (NA
Alia B.
1250

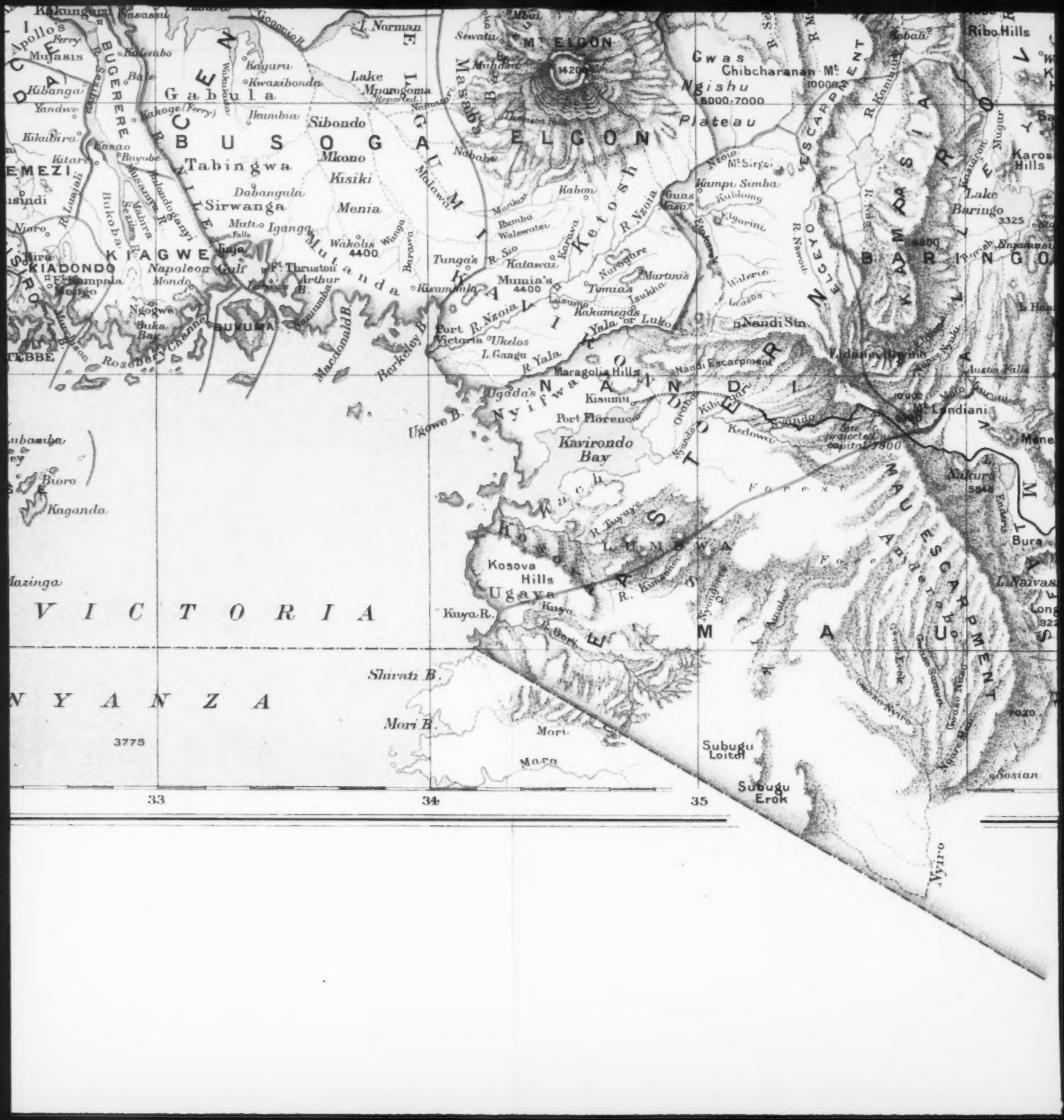

37
R. Nasam
5
LAKE
STEFANIE
the
4
B.


0 10 20 30 40 50 60 70 80 90 100
Natural Scale. 1: 2,000,000 or 31·56 miles = 1 inch.
Heights in feet.
Railway completed
Railway constructing
Mt Adalla
Lahore
Dufile
Fanto
Faskalu
Fado
Fayira
Logolu
Faranga
Obufi
Wadelai
Farabongo
Rigelia
Koche
Koro
Baggaia
Achaua
Faratai
Mortengola
Gebola
Modo
Dufa
Murchison Falls
Magungu
Fajao
Foshora
Foweira
3470
Shifalu
Mahagi
Mpala
Kasomba
Kichwali
Chambili
Kirunguru
Kirota
Kosoko
Kitao
Mt Mahorzi
Masindi
Kibero
Kitanwa
2170
Lukungu
Muruli
Kiyange
Yapodia
Buruli
Kangos
Hoima
Mpala
R. Kafu
Bugoma
Dweru Gulf
Kigagara
Kwuzi
Usamba
Kitangezi
BURULI
ALBERT NYANZA
UNYORO
KIBERO
MAWOKOTA
LENDU
ROVINGA
BUGAYAOBEIRO
Limit of the Great Forest
R. NILE
VICTORIA NILE
EL HAMUR
MADI
ACHOLI
STATE


Agoro 3400
Lotorath Mts
Morongole H.
7500
6000
5800
Kiteng Pk
Kilamoyo's
Mt Kokoro
Rom Mts
Mt Lopala 6600
Umia
Napono Mt
6100
Lira
Jira
R. Udat
6050
Lobor Mts
Nakwai Hills 6000
Lake Kirkpatrick
Kizima
Nopak 7600
Kamalinga 8000
Poritoke
Kosoko
Langa
Kitao
Mahorzi
L. Kwania
Ndo
Wachitwe
Bwiro
Kubagambo's
Naika H.
Kateta
LAKE KIOGA 3320
Kakungulu
Nasassu
Kahera
Gogonio R.
L. Norman
Ferry
Apollo's
Jiwe Mts 6500
Dochen
Bukora
Murlinga
Manimani
Manimani
Kagate L.
Mt Debasien 9500 9700
L. Gedge
Kiboko
Karita
Bomba
3850
Salisbury
Sore
Mbui
Sirokwa
Sewatu
Mt ELGON
Kilwuk
Tarash
Murosokan Hills
Magosi
Lokopoto
Kozibir Hills
Moroto H. 10010
Maroto
Chemorangit Mts
Ngeronom
10000
Berkate Hills 9300
Berkate
Suk Mts
Sekere Pk
Sekere
March
Kapunleil
Yiate Hills 4500
Ribo Hills
Kobah
Kagwalas Hills
Murunore
R. Turkwel
Kogemat
Lusagam Bay
Mt Losagam 1830
Ngamatak Hills
Elemo Hills
Amotule H.
Tirin H.
Ikuta H.
Ngabaru
Alongol H.
LAKE SUGOTA 3300
Laterok H.
Masol H.
Alia B.
1250
Choro I.
Kobua
Lubur R.
Ferguson R.
Tapuzamatak
R. Okorra
R. Baggar
R. Kania
R. Assua
R. Langa
Rapids
Athenuth
Nakodokordoi
Purle
R. Kerio
R. Oron
R. Selbel
R. Muron
Susano Mt
Swam
Kaabong
Kotido
Karamoja
Turkwel
Lango
Bukedi
Kwarra
Rimama
Teso
Suk
Elgon
Lake
Dodoth
Jie
Karamojong
Turkana
Nandi
Suk
Masai
Uganda
Kenya
Sudan

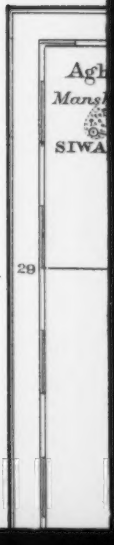

4
3
2
Lusagam Bay
Elmolo I.
Andrew Volcano
Mt. Nyiro 10000
1300
Lammagy
Maseroi
Marsabit
Bebes
Hills
Hills
R. Uron

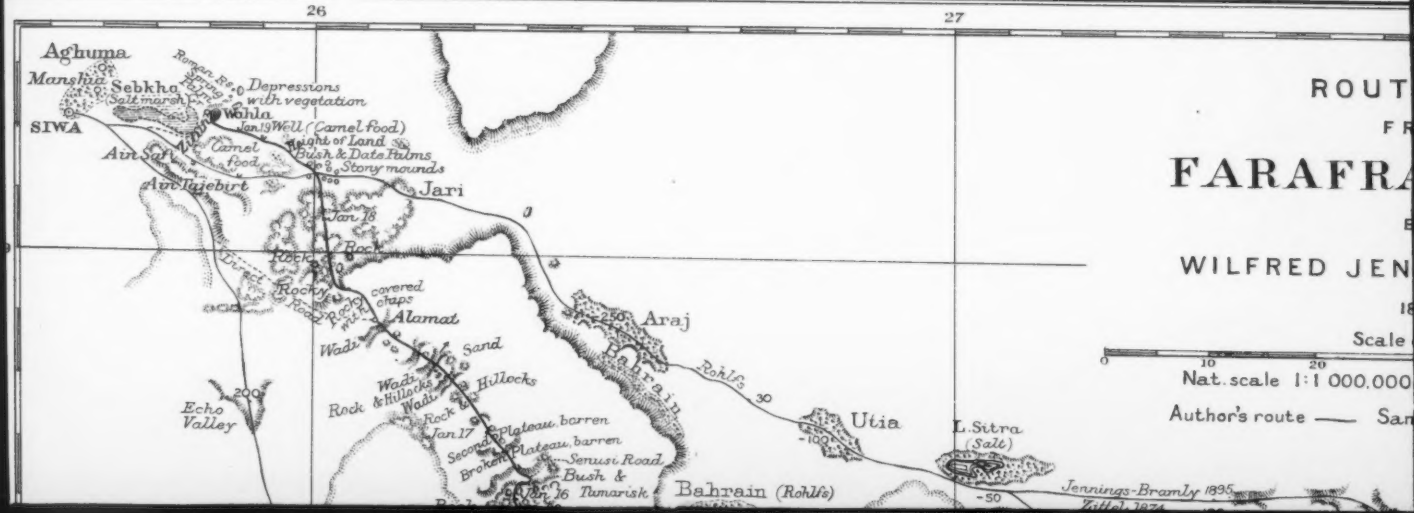
CONGO FREE STATE
BUGANDA
BUNYORO
TORO
ANKOLE
KARAGWE
GERMAN EAST AFRICA
BUYAGA
BUGANGAZZI
BWEKULA
BUSUJU
GGOMBA
MAWOGOLA
KABULA
KOKI
BUDDU
BUSESE
BULEMEZI
BUTAMBALA
MAWOKOTA
BURULI
Mukwendas
Mugema's
Kiambalango
Lwekula's
Kabula
Masaka
Bichumbi
Mahungo
Kumchinga
Kitangole
Kibate or Bukora
Fort Portal
Fort George
Fort Grant
Fort Stanley
Fort Bukoba
Kiyanja
Duwoni
Mbeni
Dweru
Lake Dweru
Lake Albert Edward Nyanza
3106
Ruwenzori Range
Semliki R.
Kagera R.
Katonga R.
Chaka
Grassy Few Trees
Limit of the Forest
Dwera Gulf
Kiwanga
Kiwagosi
Nakabimba
Kiroonga
Nyama
Kirianga
Kahonula
Mwanu
Kasinga
Mugungulu
Siboa
Nabukaki
Kawere
Gomba
Butunzi
Kisozzi
Kirkoma
Katoma
Nsongi
Nabusozi
Kahiro
Kitara
Kitanguli
Bisharara
Mbaraga
L. Kiambi
L. Mburu
L. Kachera
Rakai
High Hills
Charibiko
L. Mazingo
Kahega
Kalauta
L. Kafungo
L. Ruakelenge
Nyamiasi
Songa
Rhbanga
L. Chagaso
L. Kilombe
Mazinga
Semagala
Lubamba
Buganga
Sekanga
Bwera
Kitete
Kahuru
Wompumu
Mwalala
Mango
Mukeroro
Ruchuru
Dorare
Nabuyusa
Kiaja
Kitasiwenda
Nyangwa
Kitagora
Ruiba
Mpanga R.
Dura
Mubuko
Chambura
Lubiri
Mpororo
Ba-Kingo
Lokolo R.
Bakonjo
Bambute
Balese Forest
Bandaka
Lega
Ba-amba
Mboga
Burega
Kisego
Kisumba
Kivale
Kawaro
Kasenga
Kisala
Kienya
Kikengao
Kaduma
Mwenda
3733
Kabanga
Ngusi
Bugayaoo
Kasumba
Ruganga
Usamba
Ngalabuzi
Lukogo
Apollos
Mujasi
Kibanga
Yandwe
Kikubira
Kitoro
Kaboga
Karuma
Kawero
Kazoroga
Mugoma
Kiwale
Bawanga
Nakabimba
Busindi
Niaro
Makonzi
L. Isolt (Wamala)
Mitiana
Mwera
Kiadondo
Kisozzi
Kawere
Kasozi
Sekanga
Buganga
Buvu
Lubamba
Fort Stanley
Semagala
Mazinga
Kibate or Bukora
Kitangole
Fort Bukoba
Kagera R.
Rakai
Kalauta
Kahega
Charibiko
Songa
Nyamiasi
Rhbanga
L. Chagaso
L. Kilombe
Mahungo
Kumchinga
Ruanda
Bichumbi
Ruchuru
Mukeroro
Dorare
L. Ruakelenge
L. Kafungo
L. Mazingo
L. Kachera
L. Mburu
L. Kiambi
Kitangole
Kitara
Kitete
Kahuru
Wompumu
Mwalala
Mango
Nabusozi
Kahiro
Nsongi
Kirkoma
Katoma
Kabula
Niskisi
Bisharara
Mbaraga
Kitanguli
Nyangwa
Kitasiwenda

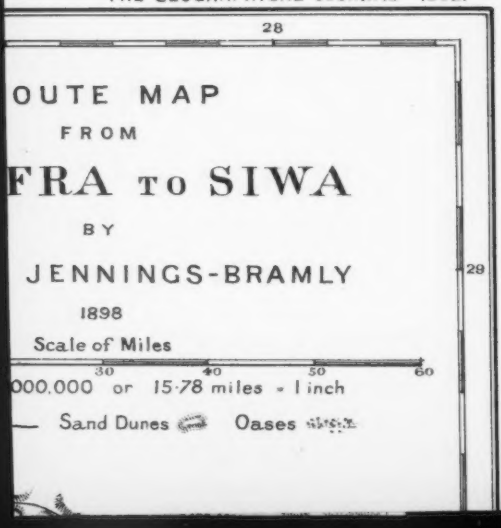

M. ELGON
14200
Gwas Ngishu
8000-7000
Plateau
Chibcharanan Mt.
10000
ESCARPMENT
Ribo Hills
Karos Hills
Lake Baringo
3325
BARINGO
Gabula
BUSOGA
Tabingwa
Sibondo
Mkono
Kisiki
Dabangula
Sirwanga
Menia
Iganga
Wakolis
4400
Mumia's
4400
Kavirondo Bay
Port Florence
Port Victoria
Ugowe B.
Ugoda's
Nyifwa
Maragolia Hills
Nandi Escarpment
Nandi Sta.
Kisumu
Kedowa
Landiani
Nakuru
5843
Kosova Hills
Ugaya
Kuya R.
Kuya
Shirati B.
Mori B.
Mori
Mara
Subugu Loitol
Subugu Erok
Ndosian
3775
VICTORIA
NYANZA
MAU ESCARPMENT
Forest
Kericho
Londiani
Bura
Mau Escarpment
Kavirondo Gulf
Napoleon Gulf
Thurston Arthur Peninsula
Rosebery Channel
Buka Bay
Ngogwe
BUVUMA
KIAGWE
KIADONDO
Kaganda
Bioro
Mazinga
Kakoge (Ferry)
Ikumbia
Kwaxibonda
Lake Mpongoma
Kakamega
Yala or Luko
Lumbwa
Kericho
Fort Ternan
Tinderet
Sotik
Kipsian
Ayiro
33
34
35

Debeq
Hills
Goumuti
7800
Warga
Kuriamwin
Hills
Bariani
Hills
Karosi
Hills
7000
ESCARPMENT
3325
7330
G O
LAIKIPIA
LAIKIPIA
Gwaso Narok
L. Hannington
Gobit
ABERDARE
Menengai
Mt.
Subugo
MOUNTAINS
L. Elmenteita
Gojito
M. 13350
Bura
Mt.
Kinangop
12820
L. Naivasha
NAIVASHA
8312
Longonot
9224
Jabe Hill
7020
Suswa
7840
R. Kedong
KIKUYU ESCARPMENT
RAILWAY
Nairobi
1
0
1
37

H. Manly, *lith.*

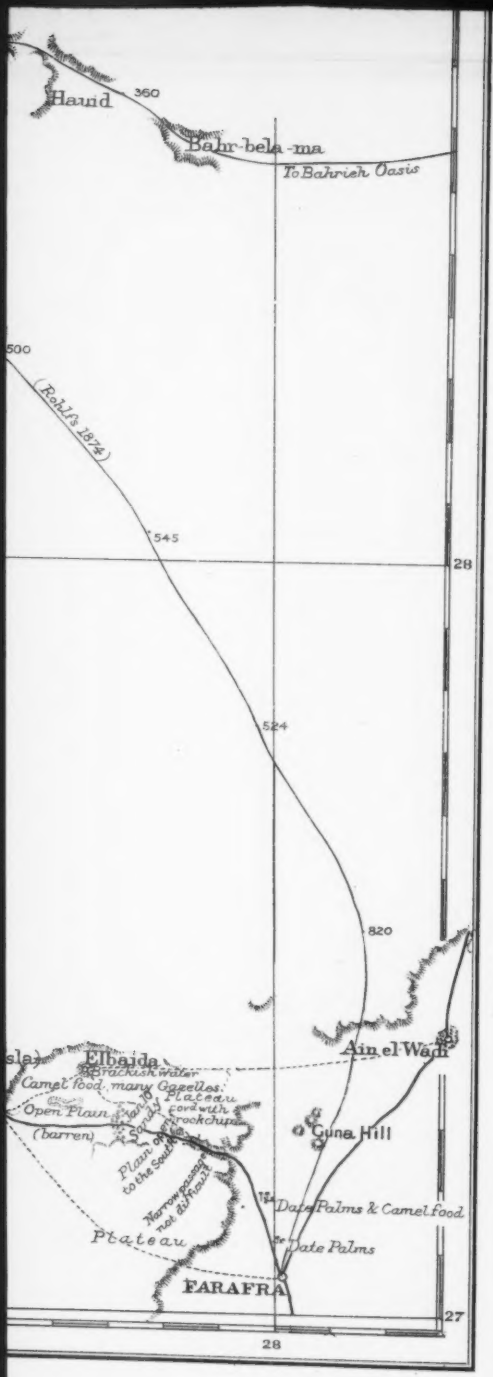

Agh
Mansh
SIWA
29


26
27
Aghuma
Manshia
Sebkho
Salt marsh
SIWA
Wahla
Jan 19 Well (Camel food)
Depressions with vegetation
Height of Land
Bush & Date Palms
Stony mounds
Camel food
Jari
Jan 16
Rocky
Alamat
covered chaps
Wadi
Sand
Araj
Bahrain
Rohlfs
Utia
-100
L. Sitra
(Salt)
-50
Wadi & Hillocks
Rock & Hillocks
Jan 17
Plateau barren
Second Broken Plateau barren
Senusi Road
Bush & Tamarisk
Jan 16
Bahrain (Rohlfs)
Echo Valley
200
Jennings-Bramly 1895
Zittel 1874
ROUT
FARAFRA
WILFRED JEN
Scale
0
10
20
Nat. scale 1:1 000.000
Author's route —— San


28
OUTE MAP
FROM
FRA to SIWA
BY
JENNINGS-BRAMLY
1898
Scale of Miles
30
40
50
60
000.000 or 15·78 miles = 1 inch
Sand Dunes
Oases
29

28
27

Published by the Royal Geographical Society.


Haud
360
Bahr-bela-ma
To Bahrieh Oasis
500
(Rohlfs 1874)
545
28
524
820
Elbaida
Brackish water
Camel food, many Gazelles.
Plateau
covered with
Brookchips
Open Plain
(barren)
Ain el Wadi
Guna Hill
Date Palms & Camel food
Date Palms
Plateau
FARAFRA
27
28